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Blackfeet-
Glacier, Montana
solid waste
management plan

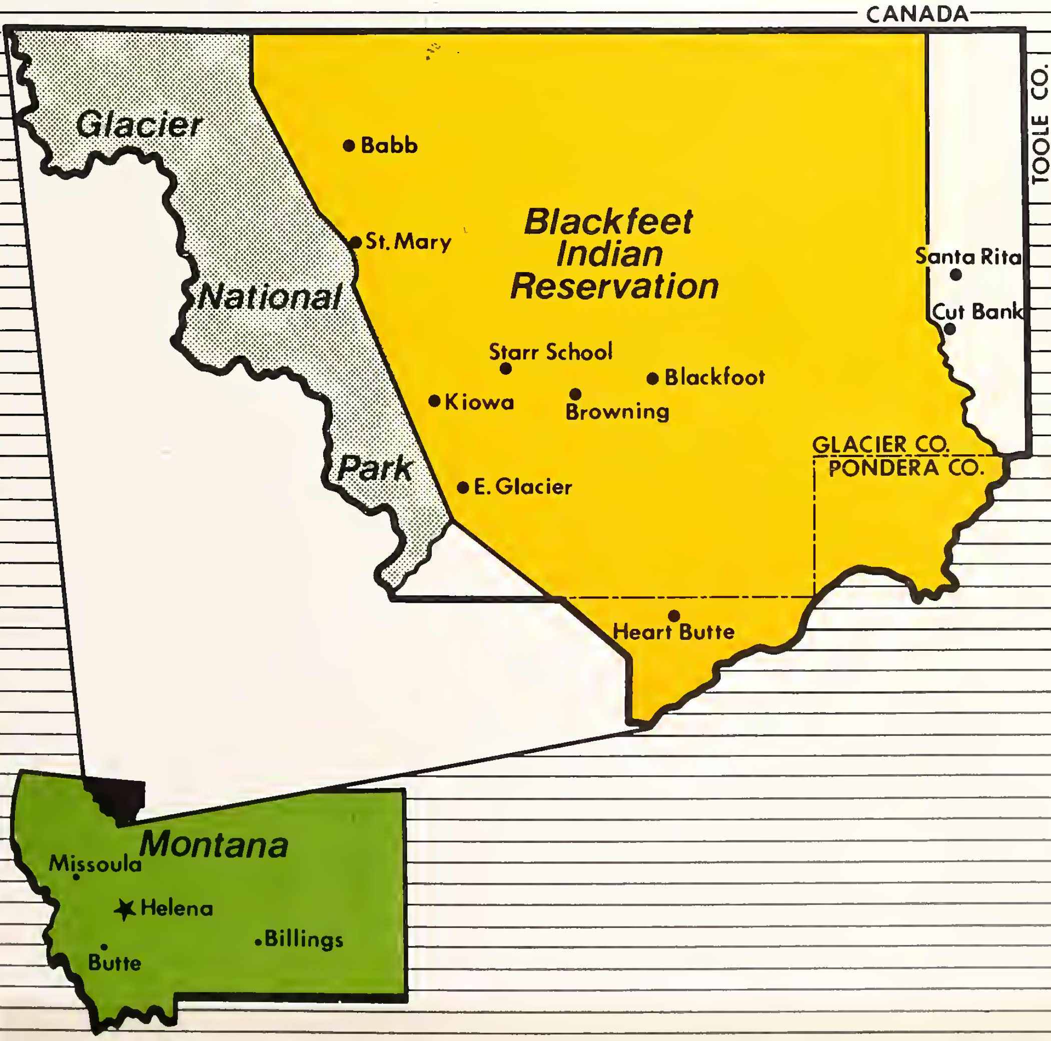
Region VIII
1860 Lincoln Street
Denver, Colorado 80295

June , 1982
Report No.
908/6-82-004

Solid Waste

Blackfeet - Glacier, Montana Solid Waste Management Plan

A Technical Assistance Panels Program Report



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BLACKFEET-GLACIER, MONTANA
SOLID WASTE MANAGEMENT PLAN
A TECHNICAL ASSISTANCE PANELS PROGRAM REPORT

Prepared for:

U.S. Environmental Protection Agency
Region VIII
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June, 1982

Report No. 908/6-82-004

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Public Law 94-580 - October 21, 1976

Technical assistance by personnel teams. 42 USC 6913

RESOURCE RECOVERY AND CONSERVATION PANELS

SEC. 2003. The Administrator shall provide teams of personnel, including Federal, State, and Local Employees or contractors (hereinafter referred to as "Resource Conservation and Recovery Panels") to provide technical assistance on solid waste management, resource recovery, and resource conservation. Such teams shall include technical, marketing, financial, and institutional specialists, and the services of such teams shall be provided without charge to States or local governments.

This report has been reviewed by the Project Officer, EPA, and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Project Officer: William Rothenmeyer, EPA Region VIII

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BLACKFEET–GLACIER, MONTANA SOLID WASTE MANAGEMENT PLAN

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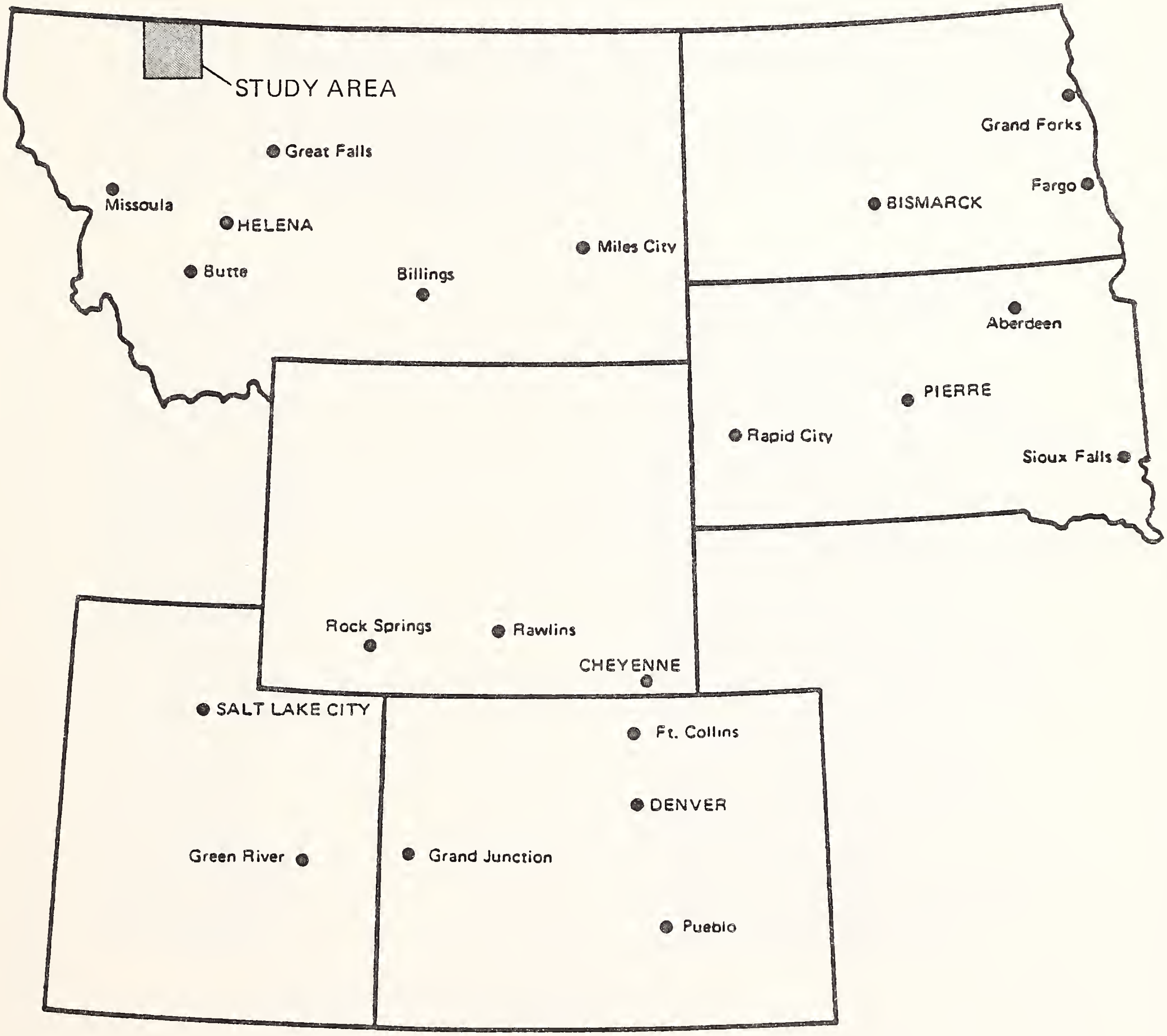

ACKNOWLEDGMENT

The successful completion of this study was made possible through the cooperation and assistance of many individuals and agencies. Special recognition should be given to the members of the Solid Waste Technical Committee who have been involved in this project from its conception. The hard work and effort provided by these individuals has been a key for the success and completion of the project.

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PART ONE

INTRODUCTION AND SUMMARY

PART ONE

INTRODUCTION

A. BACKGROUND

In the summer of 1978 Blackfeet tribal officials, representatives of several federal agencies including the Environmental Protection Agency and the Indian Health Service, and local officials of the Town of Browning began efforts to form a Solid Waste Disposal program on the Blackfeet Indian Reservation. Because of several problems encountered due to the overlapping of various jurisdictional entities, a disposal program was never implemented. In the interim, however, a tribally-managed solid waste collection and disposal service was created for the residents of the Reservation and any private individuals or commercial establishments willing to contract for service.

In addition to the jurisdiction-related problems discussed above, the solid waste disposal problem in the area was compounded in 1980 when a bear mauling incident resulted in the deaths of two individuals in the St. Mary area. The open dump located near St. Mary may have been a contributing factor in the incident.

Based on the various jurisdictional and bear-related problems, federal officials representing Glacier National Park and the Blackfeet Indian Reservation requested assistance in the fall of 1980 under the EPA Technical Assistance Panel Program to analyze the solid waste collection and disposal procedures in the area and to determine the feasibility of establishing an intergovernmental solid waste disposal program. Federal assistance funds were subsequently obtained and a consultant was retained in February, 1981 to prepare a comprehensive solid waste management plan for the study area. Basically, the study area encompasses the eastern portion of Glacier National Park, all areas within the Blackfeet Indian Reservation, and the remaining portion of Glacier County located outside the reservation.

Prior to initiating the actual study, a Technical Advisory Committee was formed to oversee the work completed by the Consultant as well as to assist in the decision-making process. This committee is comprised of key officials from each jurisdictional entity located within the study area as well as representatives from the State of Montana and local health departments, the Environmental Protection Agency, and the Bureau of Indian Affairs. Over the course of the project, the Technical Committee and the Consultant met and reviewed the status and preliminary findings of the project on several different occasions.

B. SCOPE OF WORK

Initially, a detailed scope of work was developed by the Environmental Protection Agency with cooperation and guidance from several local and state officials. The work elements deemed applicable were developed such that the recommendations could be formulated in an orderly sequence for the proper disposal of solid waste generated within the study area. Included herein is a summary of the work elements considered for this project.

1) Identification of current and future demographic conditions in the study area, including general land use, population characteristics, and visitation and use of the facilities by tourists within Glacier National Park.

2) Identification and evaluation of current solid waste management conditions within the study area, including solid waste storage, collection, transfer and disposal operations and facilities, and waste generation and composition characteristics.

3) Evaluation of alternate solid waste collection, transfer and disposal concepts with emphasis placed on the practicability and costs of the specific alternatives.

4) Evaluation of current problems and possible alternate solutions for "special" type waste disposal, including junk vehicles, tires, demolition debris, used oils, septic tank pumpings, and sludge.

5) Formulation of a recommended plan for properly transferring and disposing of solid wastes generated within the study area with regard to location, use and environmental restrictions, and practicability of each alternative.

6) Evaluation of alternative organizational structures that would be required to implement the recommended plan by the various jurisdictional entities included in the study area.

7) Preparation of a report that summarizes all findings, conclusions and recommendations of the project.

C. PROJECT SUMMARY AND RECOMMENDATIONS

Included in the following narrative is a summary of the findings, conclusions and recommendations of the study.

1. Demographic Conditions

Current estimates indicate that approximately 8,122 people live in the study area (excluding the City of Cut Bank). It is projected that the population will increase to approximately 9,350 by the year 2000. Current estimates indicate that 5,691, or roughly 70 percent of the study area popula-

tion, are Indians. It is expected that this percentage breakdown will increase slightly over the next 20-year period.

2. Existing Solid Waste Management Conditions

Currently the majority of the waste generated within the study area is disposed of at a State of Montana-licensed landfill located near Browning. The operation of this site is the responsibility of the Town of Browning. In 1979 the Blackfeet Indian Reservation instituted a rural container system consisting of approximately 130 four-cubic-yard containers strategically located throughout the Reservation and two 20-cubic-yard, side-loading packer vehicles, which are utilized to periodically empty the containers and transport the wastes to the Browning landfill. This system, which was obtained through a grant from the Indian Health Service, is operated under the authority of the Blackfeet Tribal Health Department. This system replaces the six open burning dumps which served the Reservation population until recently.

In regard to Glacier National Park, the wastes currently generated in the eastern portion of the Park are being transported to the Browning landfill for disposal. Currently, all wastes generated at campgrounds, picnic areas and tourist attractions under the jurisdiction of the National Park Service are collected and transported to Browning daily by Park personnel utilizing a small packer vehicle. Likewise, all wastes generated at the privately-operated facilities within the Park boundaries are collected and transported by the private concessionaire to the Browning landfill utilizing a similar packer vehicle.

The incorporated communities of Browning and Cut Bank both operate municipally owned door-to-door collection systems. The Town of Browning disposes of these wastes at their community landfill. The City of Cut Bank operates its own sanitary landfill, and disposes of community wastes there.

3. Alternate Disposal Systems Analysis

Through a detailed analysis, several solid waste disposal concepts were evaluated for the study area. After several meetings between the Consultant and the Project Technical Committee members, the number of alternatives was reduced to four. These four alternatives are: 1) utilization of several satellite landfill sites operated in compliance with all state and federal criteria; 2) closure of all open dump sites and the continued use of the "Green Box" container system with minor modifications to the current collection routes; 3) closure of all open dump sites and replacement of the "Green Box" system with a "Roll-Off" system (40-cubic-yard container sites strategically located throughout the study area); and 4) a program combining both the "Green Box" and "Roll-Off"systems. Cost analysis of these alternatives determined that the annual costs would vary from $128,350 to $214,400, with the "Roll-Off" alternative (#3) being the least-cost alternative.

4. Recycling Feasibility Analysis

Generally, there are two types of recoverable materials found in the solid waste generated within the study area. These include: 1) secondary materials such as ferrous and non-ferrous metals, newsprint, cardboard and glass; and 2) combustible materials that can be used as a fuel source to generate steam, electricity and/or heat. It was determined that current market conditions do not favor the implementation of an areawide recycling program for the secondary materials found in the solid waste stream at this time. Regional markets do exist, however, for individuals to recover and sell newsprint, aluminum and glass. The analysis conducted for this study also concluded that the feasibility of utilizing solid waste as an energy source is not cost-effective at this time.

5. Recommended Solid Waste Management Plan

The various applicable disposal alternatives and implementation strategies were extensively reviewed with the Technical Committee members throughout the course of this study. Based upon these meetings, a tentative recommended solid waste management plan was developed. The primary strategies recommended for the study area include the following:

a. Disposal System

The recommended disposal system includes the continued and expanded use of the current "Green Box" container system and the closure of all dump sites on the Reservation except the Browning landfill, which would serve as an areawide landfill. Under this plan, the City of Cut Bank would continue to operate its city-owned landfill for the disposal of all wastes from the City of Cut Bank as well as those generated in the southeastern portion of Glacier County. The National Park Service and the Park Concessionaire would continue to individually collect and transport the wastes generated within the eastern portion of Glacier National Park to the Browning landfill for disposal.

b. Organizational Strategy

The recommended organizational strategy consists of a Policy Board representing the four main jurisdictional entities included in the study area, which would be responsible for the operation, administration, and financing of the recommended disposal system. The four jurisdictional entities included in the project would include Glacier National Park, the Town of Browning, Glacier County, and the Blackfeet Indian Reservation. (Since Glacier National Park is a federal agency, it would not be allowed to be a voting member on the Policy Board but would be involved on the Board in an advisory capacity.) Under the recommended plan, the costs incurred for disposing of the wastes generated by the non-Indian population within that area of Pondera County that is located within the Blackfeet Indian Reservation would be assessed through an interlocal agreement between the Pondera and Glacier County Commissioners. Likewise, the proportioniate costs to dispose of the Park concessionaires waste at the Browning landfill would be assessed through an interlocal agreement be-

tween the National Park Service and the Park concessionaire. Also under the recommended plan, the City of Cut Bank would not be included in the regional plan and would continue to operate its collection and disposal operations individually.

c. Operational Strategy

The recommended operational strategy included in this plan assumes that the Browning landfill and the "Green Box" containers would continue to be operated under the current management situation on a temporary basis. Ultimately, however, the proposed operational strategy recommends that the ownership and/or operation of the recommended disposal facilities and equipment be subcontracted to private enterprise or a non-profit organization.

d. Financial Strategy

It is recommended that all financial management decisions be made by the Policy Board for the project. The Board's responsibilities would include: 1) preparation of budgets; 2) assessment of equitable user fees; 3) preparation and administration of subcontracts; and 4) authorization of payments for all incurred expenses. In order to administer the funds for the program, it would be necessary to delineate a legal entity through which all funds must pass. As a result of numerous meetings, it was the general concensus of the advisory committee that The Blackfeet Tribe would be the most logical entity to handle the funds due to the fact that the tribe owns and operates the majority of the equipment and facilities currently in use in the area. Letters from the various committee members indicating this recommendation are included in Appendix A.

The total annual budget for the project is estimated to be $198,500. These costs include the necessary amortization of capital, operation, maintenance and labor necessary for the recommended disposal facilities and systems, and necessary administrative costs to manage the disposal program. In order to obtain the necessary reserves to fund the expenses of the proposed project, it is recommended that each individual jurisdictional entity pay its equivalent proportionate cost based on the tonnage of waste generated by the entity. The estimated proportionate costs for each entity are summarized herein. A detailed description of the proceedure utilized to calculate the costs is included in Part Seven of this report.

Jurisdictional Entity	Proportionate Annual Cost
Glacier National Park	$ 8,620[1]
Town of Browning	4,070
Glacier County	62,320[2]
Blackfeet Indian Reservation	123,550
TOTAL:	$198,560

---

[1] Includes $4,440 for those wastes generated by the Park Concessionaire.

[2] Includes $2,030 for those wastes generated by the non-Indian population in that portion of Pondera County that is included in the study area.

PART TWO

STUDY AREA DESCRIPTION

PART TWO

STUDY AREA DESCRIPTION

A. GENERAL

The study area for this Solid Waste Management Plan consists of all areas within the Blackfeet Indian Reservation in Glacier and Pondera counties, the portion of Glacier National Park east of the Continental Divide, and the remainder of Glacier County excluding the City of Cut Bank. Topography varies from rugged mountains in the western portion of Glacier County to high rolling glaciated plains which cover the remainder of the study area. The location of the study area is depicted on Figure 1.

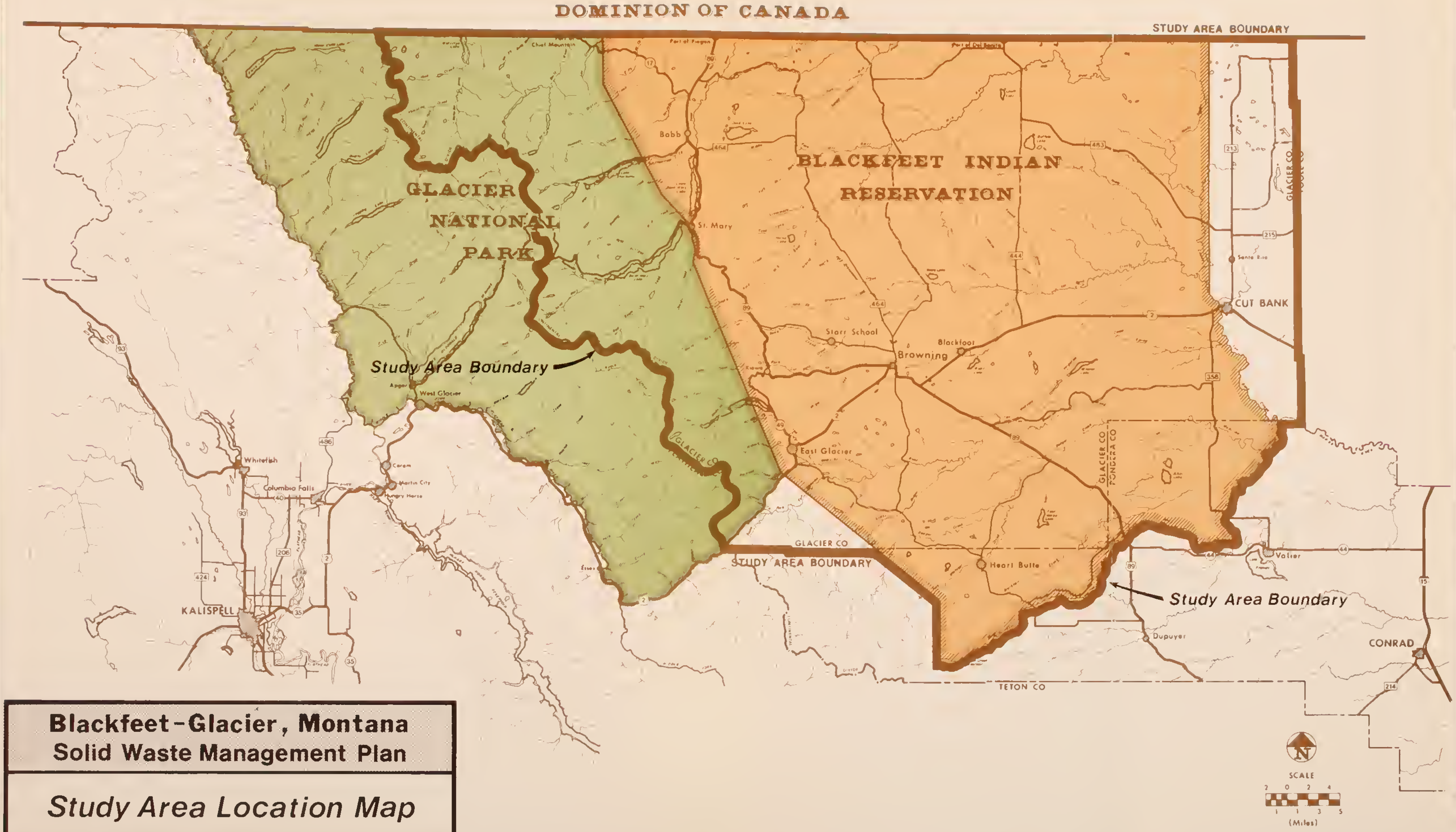
Land use within the study area is reflective of the physical nature of this region of Montana. The majority of the land on the Blackfeet Indian Reservation is utilized as rangeland and, to a lesser degree, farmland. Forest lands, most of which lie within the boundaries of Glacier National Park, account for approximately fifteen percent of the land area. Within the study area, the Blackfeet Indian Reservation comprises the largest block of land ownership. Approximately 70 percent of the land within Glacier County and 25 percent of the land in Pondera County lies within the boundaries of the Reservation. Federal lands, consisting of Glacier National Park and the Lewis and Clark National Forest, account for 21 percent of the land in Glacier County. The remaining nine percent of the County is privately owned.

Major communities within the study area are Browning, the only incorporated community and the major trade and service center on the Reservation; Babb, St. Mary and East Glacier, tourist-oriented communities located on the western edge of the Reservation; Heart Butte, located in the extreme southern portion of the Reservation; and Blackfoot and Starr School, both of which are located near Browning. Cut Bank serves as the primary local trade center within Glacier County, providing numerous types of goods and services. Several larger cities outside the study area, including Kalispell, Great Falls and Havre, serve as regional trade centers. The study area is crossed by two major transportation routes including U.S. Highways 2 and 89, and a network of state, tribal and county roads. In addition, the Burlington Northern Railroad and several public aviation facilities serve the area.

B. POPULATION

1. General

Several factors directly influence the current and projected populations of the area. These factors include birth and death rates, the differ-



Blackfeet-Glacier, Montana
Solid Waste Management Plan

Study Area Location Map

Robert Peccia & Associates / Fred C. Hart Associates

Figure 1

ence between the two being the natural increase in population; employment and economic conditions; housing conditions; and net migration trends. Over the past several years, numerous studies have been conducted by local, state, tribal and federal officials as well as consultants regarding the population-related factors for the study area. For this project, recent population data were obtained and evaluated relative to past and existing conditions, and conclusions were then drawn as to the current and future populations of the study area.

The sources of information utilized for this study include: U.S. Bureau of the Census data, Bureau of Indian Affairs and Indian Health Service estimates and projections; the "Blackfeet Comprehensive Plan", the "Environmental Health Profile and Priority Projection for the Blackfeet Service Unit"; the "Profile of the Montana Native American", and numerous population projections published by the Montana Department of Community Affairs, Research and Information Systems Division.

Glacier County experienced a sharp population increase during the 20-year period from 1920 to 1940 and continued to increase to a high of 11,565 by 1960. During the decade from 1960 to 1970 the county population began to decline, a trend experienced in most areas of the state over the same period. Recent census data indicates that the county population has continued to decline slightly to its current level of 10,628.

Historically, the population of The Blackfeet Tribe has continued to increase at about 12 percent each decade since 1920. On the Reservation, the Indian population has continued to increase while the non-Indian population has declined, a trend that is continuing, according to the 1980 census data. The out-migration rate of the Indian population on the Blackfeet Reservation is considerably higher than the state average, and is primarily a reflection of local economic conditions and job opportunities. The population of The Blackfeet Tribe is quite young, with 63 percent under the age of 25. Twenty percent are between 25 and 44 years of age, twelve percent are 45 through 64, and five percent are 65 and over.

2. Study Area Population

Due to the number of jurisdictions involved and the complex financial arrangements necessary to implement any recommended plan developed by this study, it is valuable at this time to break the study area populations into Indian and non-Indian populations for the Blackfeet Reservation, the Town of Browning and Glacier County (excluding the City of Cut Bank). The following narrative briefly summarizes the data and procedures used to determine the study area population.

a. Indian Population Residing on the Reservation

In general, the most accurate source of current population data available for the study area is provided by the U.S. Bureau of the Census. In addition to the 1980 census data, most of the previously

mentioned sources of population data were reviewed in order to determine the best source of information. During the review of the population data with tribal officials, questions arose regarding the accuracy of the 1980 census count of tribal members residing on the Reservation. Tribal officials have indicated that the 1980 census estimate is somewhat lower than the actual population. This discrepancy may be due in part to methods of data collection, the isolated nature of many Indian households, and the general mobility of the Indian people. As a result, alternate sources of population data for the Reservation were examined. The following table summarizes several sources of information that were utilized to develop a current estimate of Indian population on the Blackfeet Reservation.

Year	U.S. Census	B.I.A.	Blackfeet Comp. Plan	I.H.S.*
1970	4,594	-	4,594	5,122
1973	-	5,741	-	5,166
1978	-	6,277	-	-
1980	5,082	-	5,500	6,098

* I.H.S. service areas include the entire counties in which reservations are located; thus the population for individual reservations must be determined through adjustments.

It is evident that all the estimates vary considerably from agency to agency. The most reasonable estimate for the current Indian population for the Blackfeet Reservation was determined to be the estimate released by the Indian Health Service for the Blackfeet Service Unit of 6,098*. By utilizing the I.H.S. population estimate and the census data, it was possible to determine the number of Indians residing on the Blackfeet Reservation. This population is summarized below:

6,098	-	Indian Health Service estimate for Blackfeet Service Unit
- 277	-	less the number of Indians in the City of Cut Bank
- 130	-	less the number of Indians not on Reservation in Pondera County
5,691	-	Total Number of Indians residing on Reservation (includes Town of Browning)

b. Non-Indian Population Residing on the Reservation and in Glacier County (excluding Cut Bank)

By using detailed census data for each Enumeration District within the Reservation, it is possible to obtain an estimate of the number of

non-Indians residing on the Blackfeet Reservation and within Glacier County, excluding the City of Cut Bank.

1,285 - Total number of non-Indians on Reservation (Glacier County)
197 - Total number of non-Indians in Browning
96 - Total number of non-Indians on Reservation (Pondera County)
853 - Total number of non-Indians in remainder of Glacier County (less Cut Bank)
2,431 - Total number of non-Indians Residing on Reservation and in Glacier County (less Cut Bank)

c. Current Population in Town of Browning

After review of the 1980 census data with local officials of the Town of Browning, it was determined that the estimate of 1,226 residents was considered reasonable. This population includes 1,029 Indian residents and 197 non-Indian residents.

d. Current Study Area Population

The following figures show the total population for the study area that was derived from the previous calculations:

5,691 - Total number of Indians residing on Reservation
2,431 - Total number of non-Indians residing on Reservation in Glacier County
8,122 - Total Study Area Population

3. Population Projections

Numerous sources of population projections for the Blackfeet Reservation and Glacier County were obtained and reviewed. Many of these sources deal strictly with total county population and the populations of incorporated cities and towns, and do not break the population figures into the necessary components for this study. In addition, many of the sources of population projections are outdated, especially since the release of the current census data. These sources are still valuable, however, because most are based upon valid assumptions regarding the three major factors affecting population: births, deaths, and migration.

The "Blackfeet Comprehensive Plan" and population projections released by the Indian Health Service for the Blackfeet Service Unit were utilized to forecast the future population of the Blackfeet Reservation. Historical census data also provided a number of population trends useful in projecting study area populations. The following narrative briefly summarizes study area populations for the Indian and non-Indian populations on the Blackfeet Reservation, Town of Browning, and the remainder of rural Glacier County.

a. Future Indian Population of Reservation

After a review of the available Indian population projections for the Blackfeet Reservation, it was determined that the most reasonable forecast results from historical census data. The population of The Blackfeet Tribe has consistently grown at ten to twelve percent each decade since approximately 1910. This historical growth trend is difficult to overlook in the absence of other information. By utilizing this growth rate, the Indian population of the Blackfeet Reservation is expected to be approximately 6,380 by the year 1990 and 7,150 by the year 2000. A summary of the Indian population of the Reservation is as follows:

POPULATION PROJECTIONS
(INDIAN POPULATION ON RESERVATION)

		Blackfeet Comprehensive Plan				
Year	U.S. Census	Low Projection	Mid Projection	High Projection	I.H.S.*	Consultant's Estimate[1]
1970	4,594	4,594	4,594	4,594	-	4,594
1980	5,082	5,300	5,550	6,200	6,098	5,691
1990	-	6,000	6,700	9,250	7,628	6,380
2000	-	6,900	8,100	10,200	10,142	7,150

* I.H.S. projections for entire Blackfeet Service Unit (Total Indian Population for Glacier and Pondera counties)

[1] Utilizing growth trends from analysis of historical census data

b. Future Population of Non-Indians on Reservation and Glacier County (less Cut Bank)

The population of non-Indians on the Reservation has continued to decline since 1940, when 2,820 non-Indians were reported to reside on the Reservation. Recent census data continues to reflect this trend as revealed by the 1980 non-Indian population of 1,578 (including the Town of Browning). Historical census data indicates that the non-Indian population of the study area declined by nine percent between 1970 and 1980. This decline is expected to continue in the future, most likely at at lower rate. Assuming the non-Indian population of the study area will continue to decline at a rate of five percent each decade, the non-Indian population is expected to be 2,310 by 1990 and 2,200 by the year 2000.

c. Future Population of the Town of Browning

By utilizing growth rates similar to those projected for the Indian and non-Indian populations of the Reservation and Glacier County it is possible to project the future population of the Town of Browning. The following table summarizes the current and projected populations of the Town of Browning.

	U.S. Census	Consultant's Estimate	
	1980	1990	2000
Indian Population	1,029	1,150	1,290
Non-Indian Population	197	187	178
Total	1,226	1,337	1,468

d. Future Study Area Population

	1980	1990	2000
Indians on Reservation (total)	5,691	6,380	7,150
Non-Indians on Reservation (total) & Glacier County (less Cut Bank)	2,431	2,310	2,200
Total Study Area Population	8,122	8,690	9,350

It should be emphasized that the future populations projected for the study area are based upon historical trends and assumptions concerning the future situations of the Blackfeet Reservation and Glacier County. Projecting future populations for the study area is extremely difficult due to the infinite number of circumstances which could dramatically alter the present situation. Examples of these circumstances could include a major "boom" in the oil or natural gas industry within the study area or a situation where a fuel shortage drastically cuts the visitation to Glacier Park and thereby affects the tourist industry in the area. Either of these situations would be impossible to predict and would have substantial effects upon the study area population.

C. GLACIER NATIONAL PARK

1. General

The development of Glacier National Park occurred primarily after the Great Northern Railroad constructed its rail lines through the area in the late 1800s. In 1910, Congress created Glacier Park and development of tourist facilities began a short time later. The Great Northern Railroad promoted development within the Park through the construction of a series of lodges, hotels and dining facilities catering to tourists transported to the Park by rail. Visitation has increased steadily over the years due to the relative ease by which the Park may be reached by automobile and the increase in the number and types of recreational opportunities available within the Park. The substan-

tial increase in visitation from 1956 to 1980 is depicted in Figure 2. Peak visitation generally occurs during June, July and August; however, visits during the remainder of the year have generally increased in recent years.

2. National Park Service Facilities

All of Glacier National Park east of the Continental Divide is included in the project study area. Within this portion of the Park, numerous visitor facilities including campgrounds located at Cut Bank, Many Glacier, Rising Sun, St. Mary, and Two Medicine exist, and visitor centers are located at Logan Pass and St. Mary. Park entrances are located at St. Mary, Chief Mountain, Many Glacier, Two Medicine, Waterton and near the Cut Bank Creek area.

In addition to the previously mentioned tourist facilities, the National Park Service also has facilities at St. Mary and East Glacier which include maintenance shops, ranger stations and housing for permanent and seasonal employees. Discussion of the use and waste generation at these facilities as well as the campgrounds and visitor centers will be given in detail in Part Three of this report.

3. Concessionaire Facilities

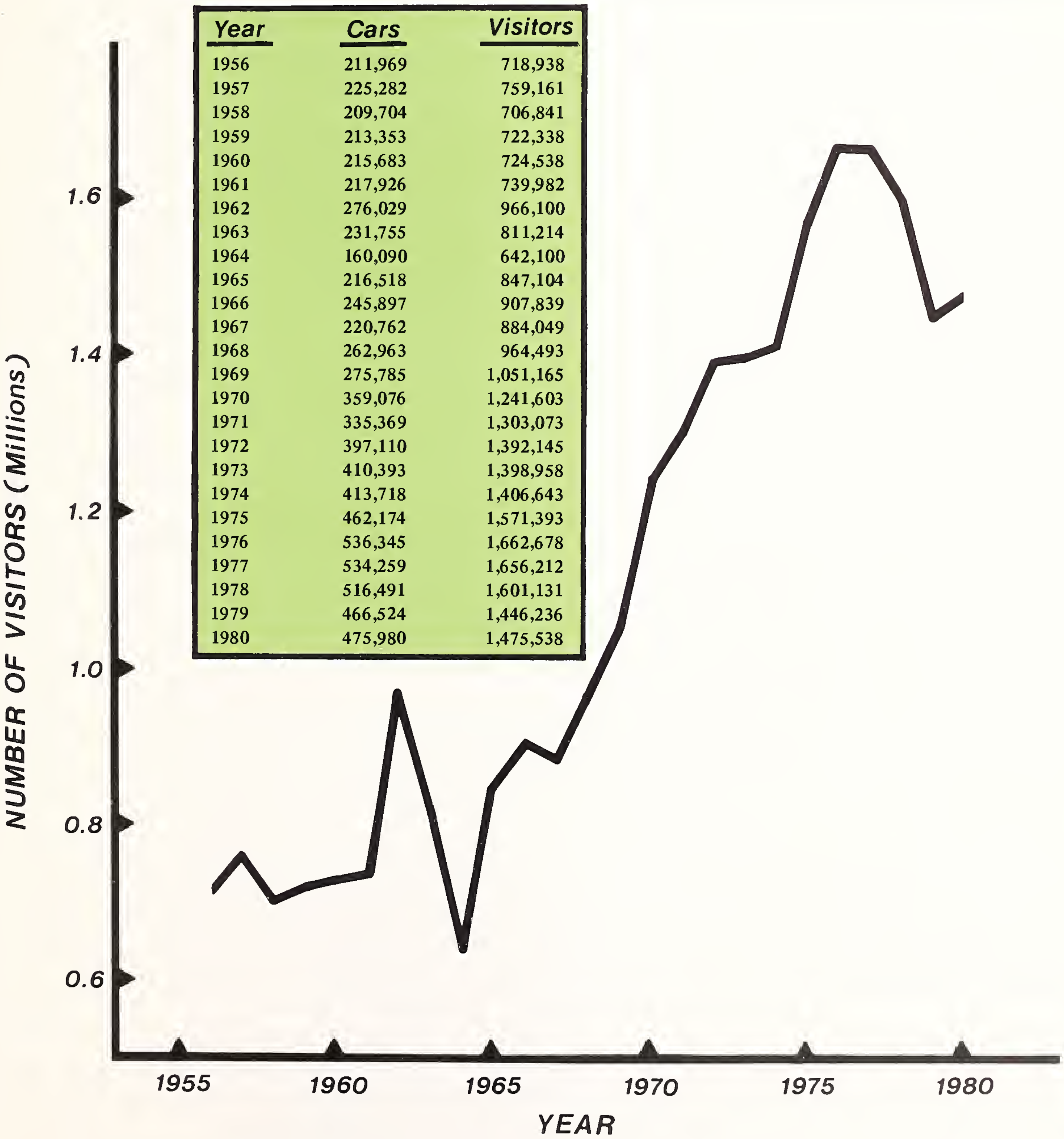
Concessionaire operations within the Park include hotels, motels, cabins, gas stations, gift shops, restaurants, stables and boat houses. These facilities are concentrated primarily at Many Glacier, Rising Sun, and Two Medicine. Visitor concession operations in 1980 increased over the 1979 season, and included a six percent increase in overnight lodging, a five percent increase in concession boat passengers, and a two percent increase in bus visitors to the Park. The use and waste generation characteristics of these facilities will be discussed in detail later in the report.

D. COMMERCIAL - INDUSTRIAL DEVELOPMENT

Commercial development within the study area is based primarily upon the yearly influx of tourists to Glacier National Park. Commercial facilities located in communities on the western edge of the Reservation are most often operated on a seasonal basis, although some year-round facilities do exist. The potential for additional development of the tourism-recreation industry on the Reservation exists due to the natural beauty of the area, its proximity to Glacier National Park, and the access to the area provided by AMTRAK rail service and the highway network. Recent development of campgrounds and recreational facilities by The Blackfeet Tribe at Lower St. Mary Lake, Duck Lake and Two Medicine Lake have provided much needed facilities for tourists.

Industrial development within the study area has been somewhat limited and is based upon the natural resources base of the area. Timber cutting is periodically practiced on the western edge of the Reservation adjacent to Glacier National Park. Three oil and gas fields are located within the study area

Glacier National Park Visitation (1956-1980)



Year	Cars	Visitors
1956	211,969	718,938
1957	225,282	759,161
1958	209,704	706,841
1959	213,353	722,338
1960	215,683	724,538
1961	217,926	739,982
1962	276,029	966,100
1963	231,755	811,214
1964	160,090	642,100
1965	216,518	847,104
1966	245,897	907,839
1967	220,762	884,049
1968	262,963	964,493
1969	275,785	1,051,165
1970	359,076	1,241,603
1971	335,369	1,303,073
1972	397,110	1,392,145
1973	410,393	1,398,958
1974	413,718	1,406,643
1975	462,174	1,571,393
1976	536,345	1,662,678
1977	534,259	1,656,212
1978	516,491	1,601,131
1979	466,524	1,446,236
1980	475,980	1,475,538

Figure 2

and have been producing since the mid-1920's. Major oil reserves are located in the Cut Bank field located northeast of Cut Bank. Oil and gas development on the western edge of the Blackfeet Reservation appears favorable, since exploration activity is quite heavy. Coal and magnetite deposits exist within the study area and the potential for mining these mineral exists in the future.

The following narrative briefly describes the current commercial-industrial development and assesses the potential for future development within the major communities in the study area. Future commercial-industrial development was evaluated with the assistance of the "Blackfeet Comprehensive Plan" and discussions with local officials.

Babb:	Commercial activity is presently oriented toward seasonal tourist trade. Many facilities are closed during the off-season. A small all-service facility providing basic services on a permanent basis is seen as necessary.
Blackfoot:	At one time, the community served as an important railhead for cattle shipments on the Reservation; currently, Blackfoot serves as an extended housing area for Browning. This area is not viewed as having a great deal of commercial-industrial potential.
Browning:	The community will continue to be the major service center on the Reservation. The community is also dependent upon tourism for much commercial activity. Industrial uses on the Reservation are centered at Browning and include a component housing plant and the Blackfeet Indian Writing Company, a major source of employment on the Reservation. Industrial park facilities are also available, and the conditions for future industrial development are favorable. Future commercial-industrial development is likely to occur in Browning.
East Glacier:	The community is geared toward tourism and will continue as such. Numerous commercial establishments and lodges exist and most are operational seasonally. The community located on U.S. Highway 2 and is served by AMTRAK passenger rail service. East Glacier is seen as a prime area for additional commercial expansion in the future.
Heart Butte:	Commercial development in the community consists of a small year-round store, post office and gas station. In addition, a small arts and crafts home industry is present in Heart Butte. Light industry and some additional commercial development would be well suited to the community.

Santa Rita: The community consists primarily of housing and some limited commercial-industrial activity. The community is oriented toward the oil and gas industry in the area and little commercial-industrial expansion is anticipated.

St. Mary: This community is primarily oriented toward providing services to Glacier Park tourists. Few of the commercial establishments are open throughout the year. St. Mary is expected to continue to be commercially oriented in the future. Definite potential for additional commercial facilities exists within the area due to the large number of tourists passing through this "gateway" community.

Starr School: This community lacks commercial-industrial development, probably because of its proximity to Browning. Strong potential for limited commercial or light industrial development exists within the community.

PART THREE

EXISTING SOLID WASTE MANAGEMENT CONDITIONS

PART THREE

EXISTING SOLID WASTE MANAGEMENT CONDITIONS

A. GENERAL

When evaluating the existing solid waste management situation in a specific area, there are three major aspects that must be addressed: 1) the current laws and regulations which govern the various phases of solid waste management; 2) the effectiveness of existing solid waste storage, collection and transportation services and the adequacy of the existing disposal facilities; and 3) the quantities and characteristics of the solid waste generated. Included in the following narrative is a brief summary of these major aspects as they relate to this project.

Obviously, there are several other aspects that are directly related to the total solid waste management system in the area. These include: 1) the recovery and recycling of solid waste; 2) the disposal of special and hazardous type wastes; and 3) the economic, organizational and financial aspects of the existing and proposed programs and systems. In the interests of greater clarity and better organization of this report, these aspects will be discussed in subsequent chapters.

B. APPLICABLE LAWS AND REGULATIONS

There are basically three degrees of laws and regulations which directly affect the management of solid waste in the study area. These include: 1) local ordinances; 2) State of Montana disposal laws and rules; and 3) federal laws and regulations. Included in the following text is a brief discussion of the various laws and regulations which directly affect the management of solid waste in the study area.

1. Local Ordinances

The Blackfeet Tribe and the Town of Browning have adopted local ordinances which require solid waste to be properly disposed of. These ordinances deal primarily with local conditions such as littering, burning and solid waste collection and disposal procedures.

2. State of Montana Laws and Regulations

The state laws concerning solid waste management were initially adopted by the 1965 State Legislature. Since that time, the regulations have been amended three times. The laws and regulations set forth by the State of Montana include legal and administrative control over all phases of solid waste management including the following: 1) facility licensing; 2) standards for the operations and maintenance of facilities; 3) facility classification; 4) solid waste transportation and disposal of hazardous wastes; 5) litter control; 6) disposal

of dead animals; 7) feeding garbage to animals; 8) nuisances; and 9) disposal of junk vehicles.

Included in the following narrative is a brief summary of the principal rules and regulations which are included in the State Solid Waste Management Act as amended in 1977. A copy of the complete rules and regulations can be obtained from the State Department of Health and Environmental Sciences, Solid Waste Management Bureau.

a. Disposal Site Licenses

Under the present state laws, all sanitary landfill sites must be licensed by the State Department of Health and Environmental Sciences, Solid Waste Management Bureau. The Department has established three classifications for refuse disposal sites. A summary of the three classifications is included below:

1) Class I

Class I sites may accept all groups of waste including hazardous wastes. Class 1 sites shall not discharge these materials or their by-products to ground or surface waters. These sites must either confine the wastes to the disposal site with no likelihood that the wastes will escape, or they must be situated in a location where the leachate from the wastes can only percolate into underlying formations which have no hydraulic continuity with usable waters.

2) Class II

Class II sites are suitable for accepting decomposable and organic materials, wood and demolition materials, and digested wastewater sludges. The site must provide for separation of these type materials from underlying or adjacent usable water. The distance of the required separation is established on a case-by-case basis, considering factors such as terrain, type of underlying soil formation, and natural quality of the groundwater.

3) Class III

Class III sites are suitable for accepting only inert-type materials, excluding potentially hazardous wastes. The site may contain water such as in marshy areas which contain exposed groundwater or areas which may be periodically flooded, such as along stream floodplains. Class III sites shall not be located on the banks or in a live or ephemeral stream.

The Department of Health and Environmental Sciences may issue a conditional license for solid waste management systems already in existence or under construction on the effective date of this rule. Such a license, if granted, will be valid for up to one year. Only when the Department determines that the conditional licensee has shown good cause for an extension will one be granted. Conditional licenses are to be granted only if the applicant demonstrates that steps are being taken to

bring the site into compliance. The local health officer must validate all conditional licenses before they are effective.

The Department may deny or revoke a license to operate a solid waste management system after giving the applicant and the local health officer written notice and an opportunity for a hearing before the Board. The decision to deny or revoke a license may be made only after finding that a solid waste management system cannot be operated or is not being operated in compliance with the state laws and regulations. The hearing held before the Board on a denial or revocation shall be held pursuant to the provisions of the Montana Administrative Procedures Act.

b. Disposal Site Operation and Maintenance Requirements

1) Class I Sites

Due to the hazardous nature of the waste that may be processed at these sites, strict supervision is required when such sites are open. Sites shall be fenced to prevent unauthorized access. All Class I sites using landfilling methods shall cover Group I wastes with a minimum of twelve (12) inches of suitable earth cover material after each operating day and up to four (4) feet of earth cover material within one week after the final deposit of solid waste. These steps must be taken unless the Department is satisfied that the licensee has shown good cause for not covering the waste.

Where other solid waste management methods are proposed to dispose of Group I wastes, the operation and maintenance plan must demonstrate to the Department's satisfaction that such disposal methods pose no danger to man and the environment. Group II wastes disposed of at Class I sites shall satisfy all Class II disposal requirements.

2) Class II Sites

All Class II sites using landfilling methods shall compact and cover solid waste with a layer of at least six (6) inches of approved earth cover material at the end of each operating day and at least two (2) feet of approved earth cover material within one week after the final deposit of solid waste at any portion of the site. These steps must be taken unless the Department is satisfied that the licensee has shown good cause for not covering the waste.

EPA's 1972 publication, Sanitary Landfill Design and Operation (No. SW-65ts), shall be used as the general landfill design and operation manual for the purposes of this rule. The Department may develop or adopt guidelines for other solid waste disposal methods and procedures. Semi-solids should be mixed with other solid waste to prevent localized leaching, or separate, specialized disposal areas should be developed. Sites shall be fenced to prevent unauthorized access and shall be supervised when open.

Where refuse containers are utilized as part of a management system for Group II solid wastes, all containers shall be maintained and kept in a sanitary manner and emptied at least once a week, unless other arrangements are determined acceptable.

3) Class III Sites

Although these sites are not required to be covered by earth materials daily, they shall be covered periodically.

4) Open Burning

For all classes of sites, the open burning of wastes is prohibited unless a variance has been obtained from the Department.

5) Litter Control

Dumping must be confined to the areas within the disposal site that can be effectively maintained. In addition, effective steps shall be taken to control litter at all facilities.

e. Hazardous Waste Management Systems

The Department may require the maintenance of records, including copies of waste manifests, and the submission of reports from persons who store, treat, or dispose of hazardous wastes. Permanent records must be maintained by the operator of a hazardous waste disposal facility, identifying the location of each disposal area and the waste or waste types disposed of therein. Such disposal records shall be made available to the new facility owner or operator if the facility is sold or leased to another person.

No hazardous waste management system may store, treat, or dispose of hazardous wastes in a manner which is inconsistent with methods approved by the Department.

All hazardous waste management systems are required to have licenses issued by the Department.

Hazardous wastes found in household refuse may be disposed of at Class II disposal sites without written authorization from the Department.

For areas not served by licensed Class I disposal sites, the Department may, upon showing of good cause, authorize the disposal of hazardous wastes at Class II disposal sites if no health hazard or no danger to the environment would be presented.

d. Inspection and Enforcement

The Department has the authority to conduct inspections of solid waste management systems at reasonable hours upon presentation of appropriate credentials. If, after an inspection, the Department determines

that violation of the Act or this rule is occurring, it shall notify the licensee of the nature of the violation. Depending upon the severity of the violation(s), the Department may seek a compliance schedule from the applicant or may initiate proceedings to revoke the license. The Department may also, through the Attorney General or appropriate county attorney, seek to enjoin the licensee or collect a criminal penalty.

e. Loans and Grants

The Department shall provide financial assistance to local governments for front-end planning activities for a proposed solid waste management system which is compatible with the state plan whenever such financial assistance is available.

The Department shall provide front-end organizational loans for the implementation of an approved solid waste management system whenever funds for such loans are available.

f. Refuse Disposal Districts

The state laws give the county commissioners the authority to create solid waste districts for the purpose of collection and/or disposal of refuse. Cities and towns may be included in the district if approved by the city or town councils.

g. Dead Animals

It is unlawful to place all or part of a dead animal in a lake, river, creek, pond, reservoir, road, street, alley lot, or field. In addition, it is unlawful to place a dead animal within one mile of the residence of any person unless the dead animal is burned or buried at least two feet underground.

If a person refuses or neglects to comply with a written order or a state or local health officer within a reasonable time specified in the order, the state or local health officer may cause the order to be complied with and may initiate an action to recover any expenses incurred from the person who refused or neglected to comply with the order. The action to recover expenses shall be brought in the name of the city or county. A person who does not comply with rules adopted by the Board will be guilty of a misdemeanor.

h. On-Site Disposal

The state solid waste laws do not prohibit individuals or industry from disposing of solid wastes on his or her own property as long as such disposal does not create a nuisance or health hazard. A nuisance is defined as "anything which is injurious to health or is indecent or offensive to the senses, or an obstruction to the free use of the property, so as to interfere with the comfortable enjoyment of life or property, or unlawfully obstructs the free passage or use, in the customary manner,

of any navigable lake, or river, bay, stream, canal, or basin, or any public park, square, street, or highway."

i. Motor Vehicle Wrecking Facility Act

Under this act, each county is to establish a county motor vehicle graveyard where any citizen may place a junk vehicle free of charge. The county is also responsible for establishing a collection program in order to pick up the junk vehicles and place them in the graveyard facility. Other provisions of the law call for licensing and shielding all private motor vehicle wrecking facilities and county motor vehicle graveyards.

j. Penalty for Violations

Any person violating the Act or regulations prescribed by the Department under the Act shall be guilty of a misdemeanor and, upon conviction, shall be fined not less than $50 nor more than $500. Each day upon which a violation of this Act occurs shall be considered a separate offense.

A person who stores, treats, transports, or disposes of a hazardous waste in violation of this chapter, a rule adopted as authorized by this chapter, or an order issued as provided for in this chapter is subject to a civil penalty of not more than $25,000. Each day upon which a violation occurs is a separate violation.

3. Federal Regulations

The federal regulations concerning the proper management of solid waste are included in the "Resource Conservation and Recovery Act of 1976" (RCRA), which is documented as Public Law 94-580. The primary purpose of the law is to suggest guidelines for the proper disposal of solid and hazardous wastes generated in the nation and also to develop guidelines for the proper and safe recovery and re-use of recyclable materials found in the solid waste system.

One primary feature of RCRA is the method by which the new federal act is to be administered by the individual state governments through the assistance of the Environmental Protection Agency. Based on this premise, the State of Montana amended its laws and rules in 1977 to be in conformance with the new federal guidelines. Therefore, the State of Montana's laws and rules coincide quite closely with the new federal standards regarding solid waste management.

C. EXISTING SOLID WASTE SERVICES AND FACILITIES

For this study, several sources of information concerning the existing solid waste management practices in the study area were identified. The primary sources that were utilized include: 1) interviews and discussions with local, state and federal officials directly responsible for the regulation and administration of the solid waste systems in the area; 2) discussions with local officials and private citizens directly responsible for the operation and/or

management of the solid waste collection, transfer or disposal services and facilities; 3) on-site inspections by the Consultant of all facilities and equipment pertinent to the management of solid waste; and 4) review of current and past reports and materials which have evaluated the existing systems and facilities.

Included herein is a summary of the existing solid waste-related services and facilities available in the study area. Figure 3 depicts the location of each disposal site evaluated. Exhibits 1a and 1b include photographs of the various solid waste-related facilities located in the area.

1. Collection

a. Blackfeet Indian Reservation

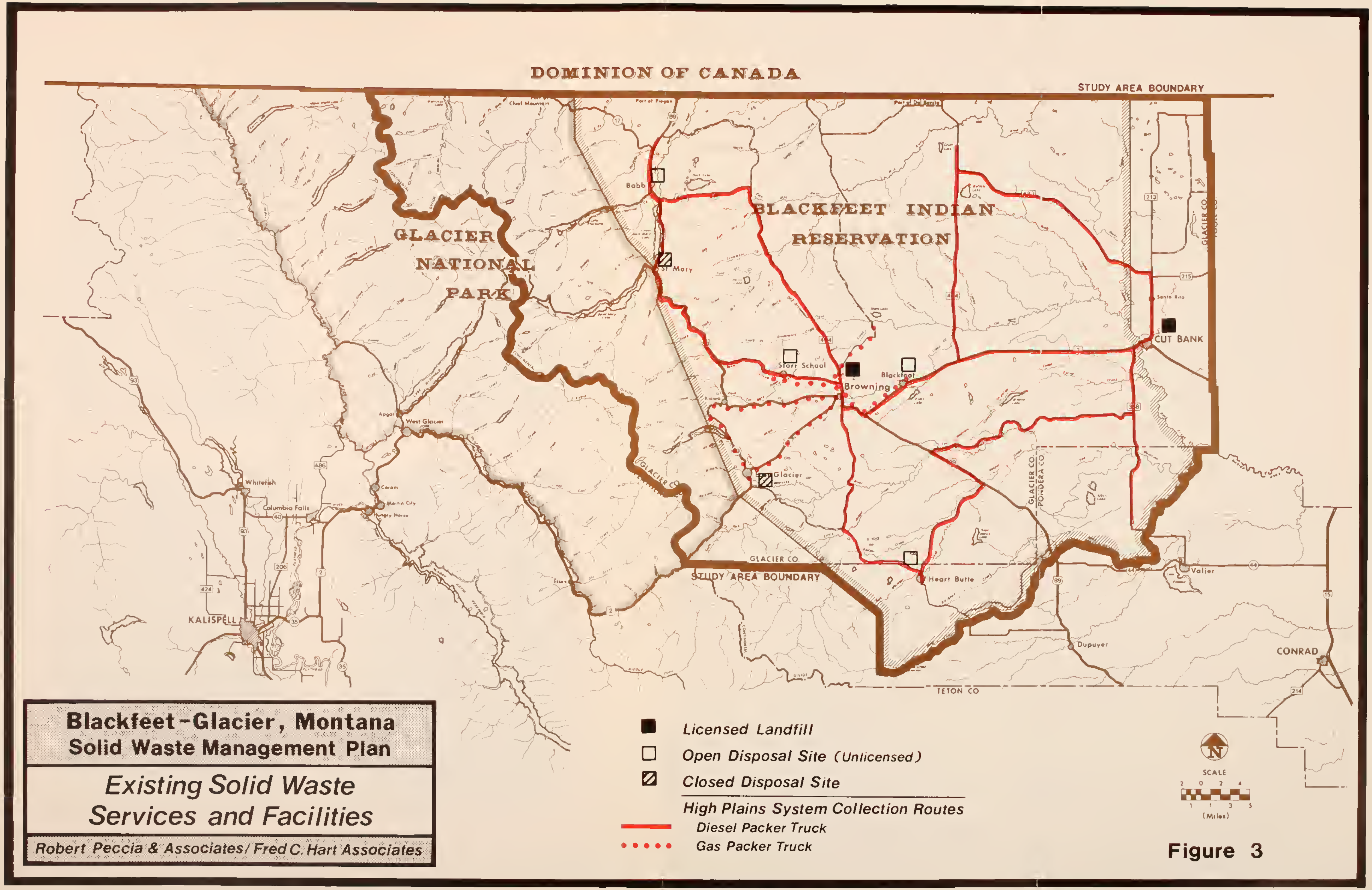
Currently, two solid waste collection services are available to residents on the Reservation. The High Plains Solid Waste System, a collection service administered by the Blackfeet Tribal Health Board, serves most areas of the Reservation and some private commercial facilities, primarily located in the tourist-oriented communities near Glacier National Park. In addition, collection service is provided to several areas of tribal housing by the Blackfeet Housing Authority.

The High Plains system utilizes two collection vehicles, a 1981 International single-axle diesel and a 1979 International, each equipped with a 20-cubic-yard "Pak-Mor" side-loading compactor. The High Plains system presently owns approximately 130 four-cubic-yard containers which are placed throughout the Reservation. The wastes generated within most areas of the Reservation are collected two to five times per week, depending on the season. Collection schedules for commercial establishments are determined on an individual basis. The High Plains Solid Waste System has established a collection fee for all commercial units, programs and family units on the Reservation in an attempt to make the program self-sufficient and equitable. This fee schedule varies dramatically and is in the process of being updated. The system operated by the Housing Authority utilizes a late-model Ford flat-bed truck for collection from permanently placed containers within the housing units outside Browning. Collection occurs on an as-needed basis from these residential units, and costs for the service are included in Housing Authority programs.

Both collection services transport all waste to the Browning landfill and are charged a dumping fee by the Town of Browning for utilizing the facility.

b. Town of Browning

The Town of Browning offers a municipal collection service to city residents at a cost of $4.00 per month. This fee includes door-to-door collection service once per week. Commercial collection schedules vary from one time per week to daily collection, depending upon the volume of



Blackfeet-Glacier, Montana
Solid Waste Management Plan

Existing Solid Waste Services and Facilities

Robert Peccia & Associates/ Fred C. Hart Associates

■ *Licensed Landfill*

□ *Open Disposal Site (Unlicensed)*

▨ *Closed Disposal Site*

High Plains System Collection Routes

— *Diesel Packer Truck*

• • • • • *Gas Packer Truck*

Figure 3

Existing Waste Handling Conditions

BROWNING LANDFILL

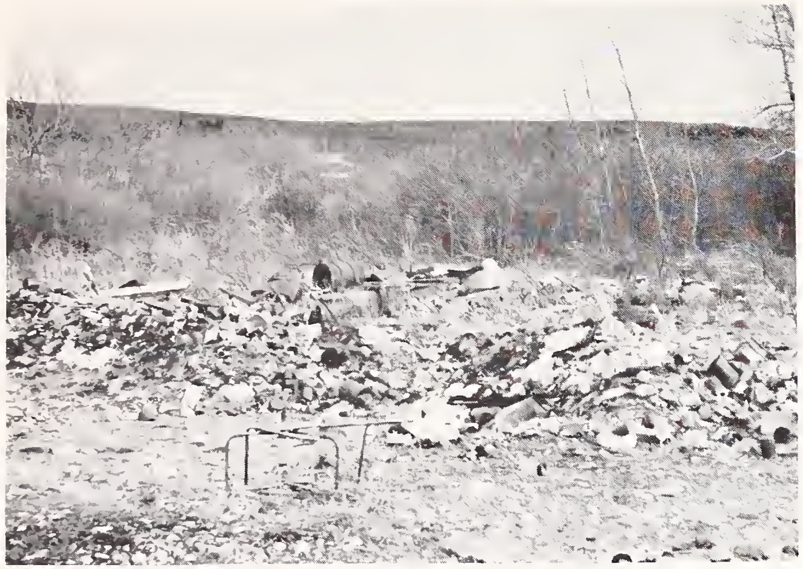
HIGH PLAINS PACKER VEHICLE

HIGH PLAINS "GREEN-BOXES"

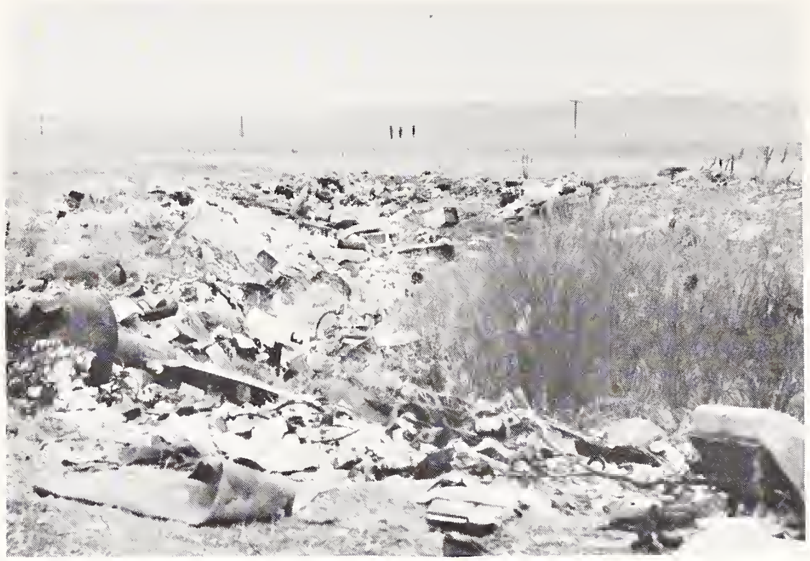
ST. MARY'S DISPOSAL SITE (closed)

Exhibit 1a

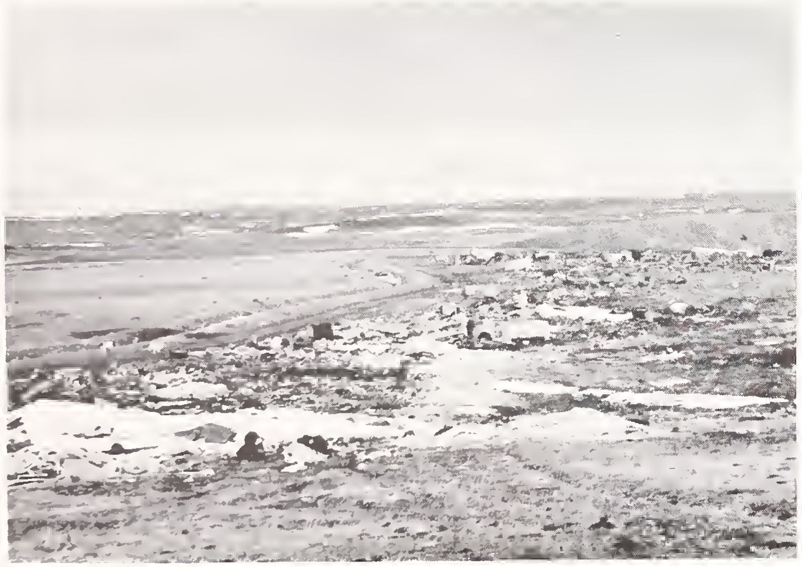
Existing Waste Handling Conditions



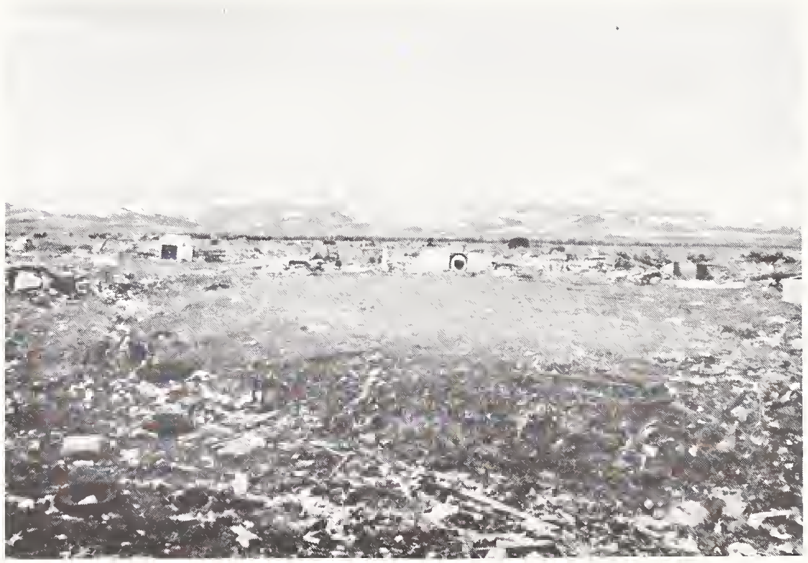
BABB DISPOSAL SITE



BLACKFOOT DISPOSAL SITE



HEART BUTTE DISPOSAL SITE



STARR SCHOOL DISPOSAL SITE

Exhibit 1b

waste generated at each establishment. Commercial rates generally range from $10.00 to $20.00 per month, although higher monthly rates may be charged to commercial establishments requiring special collection services. The Town utilizes a 1979 Ford M-800 equipped with a twenty-cubic-yard Leach compactor as a collection vehicle.

c. National Park Service

In the past, the National Park Service (NPS) provided solid waste collection and disposal service to all facilities in Glacier National Park, including Concessionaire operations. More recently, the NPS contracted the collection of solid waste from its facilities to private collection contractors. The most recent agreement for private collection service expired in 1981 and thus was not utilized for the 1981 and 1982 tourist seasons. Collection at NPS facilities during these most recent seasons is being provided by Park Service personnel. Two 12-cubic-yard rear-loading packers are utilized to collect refuse on a predetermined schedule, from "bear-proofed" 32-gallon containers placed in campgrounds, along roadsides, and at staff housing at other NPS facilities. Refuse is collected daily from nearly all NPS facilities during the tourist season, however, schedules vary depending on the type and usage of each facility during the remainder of the year. All solid wastes collected at NPS facilities are transported to the landfill located in Browning for disposal. A dumping fee is charged to the Park Service for each load of refuse deposited at the Browning site.

d. Concessionaire Facilities

Collection of solid waste generated at Concessionaire facilities within the Park is currently collected by the Park Concessionaire. The Concessionaire operates its own collection vehicle, a standard sized rear-loading packer, to collect and transport refuse to the landfill in Browning. Solid waste is collected at least three times per week from the numerous facilities under the Concessionaire's management.

2. Disposal Sites

a. Blackfeet Indian Reservation

Non-licensed dumps near the Reservation communities of Babb, Blackfoot, Heart Butte and Starr School have been and to some degree are still being used for refuse disposal. Use of some of these sites persists despite the Reservation-wide collection and disposal system and efforts by tribal, state and federal agencies to eliminate open dumping. Two sites formerly used for dumping have been closed in recent years. The Tribe is currently in the process of closing the remaining non-licensed disposal facilities on the Reservation.

The following narrative summarizes the conditions found at several open dump sites on the Reservation during an on-site investigation by the

consultant in the Spring of 1980. Since that time, some of these dumps have been cleaned up considerably or closed.

Babb: The site consists of at least forty acres of bottomland located between U.S. Highway 89 and the St. Mary River approximately one mile northwest of the community. Ownership and responsibility for the site rests with The Blackfeet Tribe. Access to the site is unrestricted and dumping may occur anywhere in the area of the site. It appears as though some problems could be experienced from flooding, and the potential for groundwater pollution is high due to the permeability of the soil at the site.

Blackfoot: The site is situated on Tribal ground approximately one-half mile northeast on the community. The site is primarily confined to a narrow depression about 200 feet wide and 1,000 to 1,500 feet long. Access to the site is unlimited, and the site has not been covered for quite some time. The soils at the site are extremely permeable. In addition, windblown litter appears to be a real problem, because litter is scattered over a large area.

Heart Butte: The dumpsite is located on tribal-owned land approximately one mile north of the Heart Butte community. The site is quite large due to the large amount of refuse scattered over the area. Access to the site is unlimited and windblown refuse is evident for several miles. The soil at the site is extremely rocky and is not very well suited for landfilling operations.

Starr School: The site is located approximately one mile northeast of the community on Tribal ground. The site is approximately twenty acres in size, and access is unlimited. Some dumping has spilled over into one drainage of Cut Bank Creek. Windblown litter also poses a problem at the site, and the refuse at the site is occasionally burned.

St. Mary: The site is located one-half mile northeast of the community on seven acres of private ground. The site has been closed and covered; however, dumping outside the fence has continued.

b. Town of Browning

The disposal site operated by the Town of Browning is located approximately five miles northeast of the community. The site consists of 70

acres of Tribal land acquired in 1975 through a 25-year lease agreement with The Blackfeet Tribe and the B.I.A. All-weather roads provide good access to the site. The entire site is fenced with a six-foot high chain link fence, and access is limited by a lockable gate. The site is open from 9:00 a.m. to 4:00 p.m. Mondays, Wednesdays, and Fridays during the winter and Monday through Friday from 9:00 a.m. to 4:00 p.m. and for a few hours on Saturday during the summer. A dozer is used to periodically maintain the site. The Town of Browning has utilized Public Service Employment personnel as gate attendants in the past. Fees are charged for dumping at the site and range from $.50 per carload to $5.00 per truckload.

A site evaluation was performed by the Soil Conservation Service in 1976. The site was determined to be suitable as a landfill site with minimal water pollution potential and good cover material. Some problems have been experience with windblown litter due to the frequent high winds common to the area.

The site is fully licensed as a Class II site by the State of Montana and may accept Group II and Group III materials for disposal.

c. City of Cut Bank

A licensed disposal facility is also available for residents of Glacier County outside the Reservation. The site is located approximately one mile northeast of Cut Bank and consists of 80 acres of fenced land. Access to the site is limited and an operator is on duty at all times. The site is open Monday through Friday during the year; however, winter operating hours are more restricted. Group II and Group III wastes are accepted for disposal at the site.

3. Summary of Existing Services and Facilities

The High Plains Solid Waste System provides a "green-box" service throughout much of the Reservation and to numerous private concerns on the edge of Glacier National Park. The National Park Service and the Concessionaire also collect and transport wastes from their respective facilities in the Park to the Browning landfill. In regard to the study area's disposal sites, it is apparent that many of the existing sites are operated below current recommended standards. This operation not only detracts from the aesthetics of the area but also is potentially hazardous to the public health. Continuing efforts are, however, being made by local officials to close many of the open dump sites in the area. According to these officials, this policy of improving or closing the dump sites in the study area will continue as time and funds allow.

D. SOLID WASTE QUANTITIES

1. General

In order to design an efficient solid waste management plan, the nature of solid wastes must be understood. For example, in this study area the majority of the wastes are generated by residences, small businesses and industries. However, significant quantities of wastes are also generated by tourists who pass through the study area each year enjoying tourist attractions and the accompanying facilities. In order to effectively develop an efficient solid waste disposal plan, all solid waste generation factors such as those special situations encountered in the study area must be considered. Included in the following narrative is a brief discussion of the solid waste generation sources, quantities and composition characteristics which were evaluated and found to be pertinent to the study.

2. Conventional Wastes

a. Waste Generation Rates

An important and useful tool in the evaluation and design of any existing or proposed solid waste system is the per capita generation, or the pounds per capita per day of solid waste generated in the area. If the quantities of solid waste generated in the past have been weighed and recorded, present and future quantities of waste can reasonably be projected.

From the Consultant's experience and from studies completed by various governmental groups, it has been determined that the generation rate per capita varies with population density. Large urban areas generate a high per capita rate because of the industrial and commercial wastes. Rural areas with little or no commercial or industrial activity generate relatively small amounts of refuse. Such solid wastes usually consist of only household wastes. Small towns generally have some commercial wastes but have very little industrial waste. An analysis of the waste generation information which has been compiled for this project as well as for previous solid waste-related projects in the state illustrates this point very well. Summarized in the following text is a brief description of waste generation data which was determined applicable for the study area.

1) Existing Disposal Site Data

An analysis of the records of all disposal sites in the study area indicate that no disposal site has an accurate record of the quantities of solid waste disposed of at the site. Some municipalities have estimates of quantities of solid waste collected by their collection crews but have little knowledge concerning the wastes brought to their disposal sites by individual haulers and citizens. In addition, many of the disposal sites have unlimited access and thus maintaining solid waste quantity data is practically impossible. Based on the lack of waste generation data available from the disposal sites located in the study area, other sources

of waste generation information must be obtained and reviewed so that quantities of solid waste can be estimated for the various jurisdictional areas located within the study area.

2) Other Available Waste Generation Data

The most applicable solid waste generation data available today for the study area is the resultant data that was obtained from detailed waste generation studies which were conducted for the state in conjunction with the State of Montana Solid Waste Management and Resource Study completed in December, 1976. During that study, detailed investigations and surveillances were conducted at ten waste disposal sites throughout the state. At each site, a one-week surveillance was conducted whereby the types, quantity and origin of the wastes were recorded for each vehicle that entered the site. Based on that information, the average waste generation rate for the various communities which utilized each site was determined by dividing each community's waste generated by each community's estimated population. Based on the data accumulated in the surveillances conducted during that study, it was determined that there is a definite correlation between the population of the individual communities and the corresponding waste generation rates. Included below is a summary of the results of that waste generation study, "Population, Employment and Waste Generation Report for the State of Montana Solid Waste Management and Resource Recovery Study, January, 1979." Only those results applicable to the study area have been included.

* Cities 1,000 to 5,000: For the cities with populations between 1,000 and 5,000 there was a distinct reduction in the total waste generated compared to the larger cities. The major reason for this was the reduction in commercial and industrial waste. The percentage breakdown by material type for these size communities was as follows: 79 percent residential, 13 percent commercial-industrial, and 8 percent demolition.

* Rural Areas: The average waste generation rate for the rural area was 2.25 pounds per person per day. This rate was substantially lower than all other population categories. This is expected since primarily only residential-type wastes are generated in rural areas with very little commercial and industrial activity.

* Average Waste Generation Rates: Based on the data obtained from the surveillance discussed above, average waste generation rates were developed for various population ranges in the state. The average rates determined applicable for the study area are summarized in the following table.

AVERAGE WASTE GENERATION RATES
(lbs./person/day)

Population	Residential	Commercial/ Industrial	Demolition Debris, etc.	Total
1,000 to 5,000	2.20	0.50	0.55	3.25
Less than 1,000 and Rural	2.00	-	0.25	2.25

A review of the waste generation data which was developed for the statewide study was compared with waste generation rates which have been developed by other governmental entities throughout the state and the nation. It was determined that the average general information determined to be applicable in the state compares quite closely with other entities and thus it is considered to be quite valid for this project.

b. Waste Quantities

Based on the waste generation rates which were determined to be applicable for this project, quantities of solid wastes currently generated in the study area were estimated by multiplying the appropriate waste generation rate with the current estimated population of the study area. Currently, it is estimated that 3,560 tons of conventional solid wastes are generated within the study area each year.

3. Tourism-Related Wastes

a. General

Tourism is extremely important in many areas of Montana, and the study area is no exception. One of Montana's great attractions, Glacier National Park, is within the study area and its presence provides the basis for a thriving tourist economy. Recreational opportunities for fishing, camping, or sightseeing are numerous in this part of Montana. Although tourism provides a large boost to many of the communities within the study area, other effects may be associated with the seasonal influx of people. The following section discusses the impact tourism has on the solid waste generation in the study area.

b. Individual Generation Sources

Throughout Glacier County and the eastern half of Glacier National

Park, numerous recreation sites exist under the management of the National Park Service, the Park Concessionaire, The Blackfeet Tribe, several federal and state agencies, and private individuals. The quantities of solid waste generated at these sites are relatively small when considered individually; however, collectively they constitute a substantial volume of refuse that must be dealt with accordingly. A basic inventory of existing tourist facilities was completed with the assistance of several sources including the use of maps, reports and interviews with involved agencies and individuals. The tourist facilities located within the study area are depicted in Figure 4.

The following section summarizes the tourist facilities present within the study area and briefly discusses the solid waste management practices of each. Estimates of current solid waste quantities generated at the various types of facilities are also presented herein.

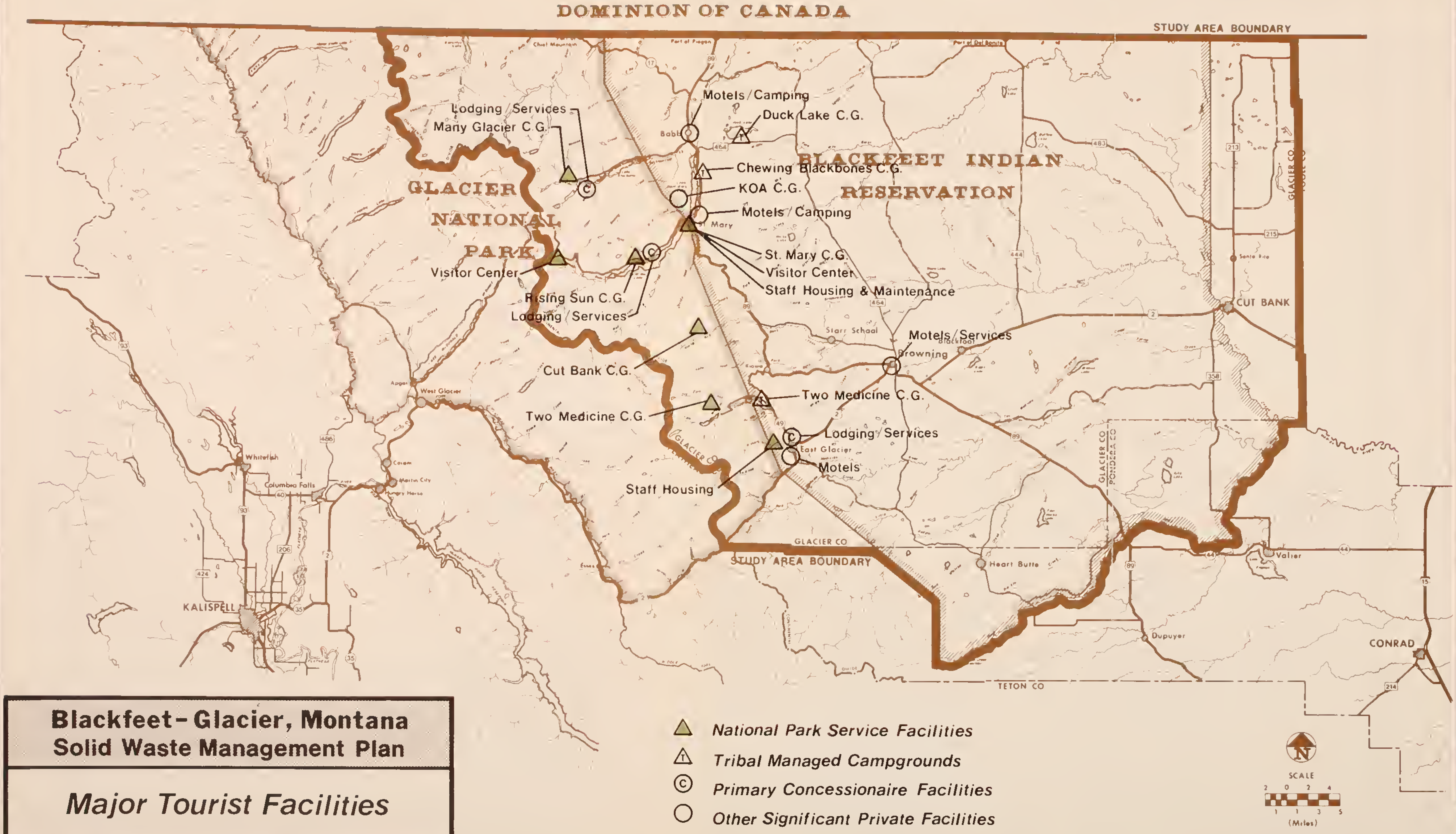
1) National Park Service

The National Park Service maintains five campgrounds (Cut Bank, Many Glacier, Rising Sun, St. Mary, and Two Medicine), two visitor centers (Logan Pass and St. Mary), staff housing (St. Mary and East Glacier), and maintenance facilities (primarily at St. Mary) in the eastern half of Glacier National Park. As previously mentioned, NPS collects refuse from each of the facilities according to a predetermined schedule and ultimately transports the solid waste to the Browning landfill. Actual counts of the number of cans collected within the Park for the past several years were obtained from NPS officials and were utilized to estimate the current quantity of solid waste generated at NPS facilities. It is estimated that 165 tons of solid waste are generated at NPS facilities annually.

2) Park Concessionaire

Concessionaire facilities in the Park are centered near Lake Sherburne, along St. Mary Lake, at Two Medicine, and at East Glacier. The Concessionaire's operations include large hotels such as the Many Glacier Hotel and the Glacier Park Lodge located at Lake Sherburne and East Glacier, respectively; motels and cabins including the Swiftcurrent Motor Inn and Lake Sherburne and the Rising Sun Motor Inn near St. Mary; and numerous other facilities including gas stations, gift shops, restaurants, grocery stores, stables and boat houses. All of these facilities require a great deal of seasonal help and the Concessionaire provides dormitory facilities near the major hotel and accompanying facilities.

Based on information obtained from the Concessionaire for the last year, it is estimated that approximately 175 tons of solid waste are generated annually at Concessionaire facilities within the eastern half of Glacier Park.



Blackfeet-Glacier, Montana
Solid Waste Management Plan

Major Tourist Facilities

Robert Peccia & Associates/ Fred C. Hart Associates

Figure 4

4. Major Private Concerns

a. Tribal-Managed Campgrounds

Campgrounds under the management of The Blackfeet Tribe are Chewing Blackbones, a multi-use facility near St. Mary; Duck Lake Campground, located near Babb; and Lower Two Medicine Campground located near Two Medicine Lake. Each of these sites is served by the High Plains Solid Waste System. Use at these facilities is similar to that experienced at NPS camping facilities, since the season extends from mid-May through September. It is estimated that approximately 23 tons of solid waste are generated during the season at these sites.

b. Other Private Campgrounds

Numerous other campgrounds exist in the study area and are primarily concentrated in and around the communities of Babb, St. Mary, and East Glacier. Most of these facilities are seasonal, with tourist use peaking in July. It is estimated that approximately 57 tons of solid waste are generated at these private campgrounds during the camping season.

c. Motels

Motel facilities are located in most major communities within the study area, although they are primarily centered in the tourist-oriented communities near Glacier Park. The St. Mary Lodge in St. Mary is the largest of the non-concessionaire-operated facilities, and it offers approximately 100 motel units and employs as many as 150 seasonal employees. Several motels are also located in Babb, East Glacier, and Browning. Some of these are open year-round, but most limit their operations or close entirely after the tourist season concludes. It is estimated that motel operations in the study area account for an additional 78 tons of solid waste during the peak tourist season. Waste generated throughout the rest of the year is included in the conventional waste quantities previously discussed.

5. Other Seasonal Generators

a. Border Ports

Within the study area, border ports are located at Chief Mountain, Piegan, and Del Bonita. Solid waste collection and disposal at these sites is generally contracted to private individuals or collection services. Traffic at the ports, especially at Chief Mountain and Piegan, increases during the summer due to the number of tourists wishing to visit Waterton Lakes National Park and the number of Canadian tourists wishing to visit the study area. It is estimated that five tons of solid waste are generated at these facilities during the year.

b. Montana Department of Highways

It is a general practice of the Montana Department of Highways to place roadside litter barrels at numerous locations along major routes. In

the past, the Highway Department utilized its own maintenance personnel to collect and dispose of refuse from these roadside barrels; however, this practice has been modified somewhat within the study area. The Highway Department has contracted with High Plains Solid Waste Systems to provide collection and disposal service for a number of four-cubic-yard containers provided by the collection service. It is estimated that approximately 30 tons of solid waste will be deposited in these roadside containers this year.

c. Waste Quantities

Based on the analysis conducted herein, it is estimated that approximately 533 tons of solid waste are generated by tourists and the major tourist-related facilities within the study area annually.

6. Summary of Waste Generation

a. Solid Waste Quantities

Based on the investigations which were made relative to the waste generation characteristics within the study area, the current quantities of solid waste generated within the area have been determined. These current quantities are depicted in Table 1. As shown, the quantities of waste have been determined for each major solid waste generation source in the study area.

As further illustrated, the wastes generated in the study area have been broken down into two waste generation categories, "conventional" wastes and "tourist-related" wastes. The quantity of "conventional" wastes represents those wastes which are generated by the full-time residents living within the study area and the corresponding commercial establishments required to serve these residents. The quantity of "tourist-related" wastes represents those additional wastes which are generated as a result of the high tourist activity within the area.

It is estimated that 4,092 tons of solid waste are generated in the study area annually. Approximately 86 percent of these wastes are generated by the permanent residents and commercial establishments located within the study area. An additional 533 tons of solid waste, or 14 percent, are generated annually as a result of tourist activity within the study area. Of these tourist-generated wastes, 64 percent are generated at recreation sites within Glacier National Park or at Concessionaire facilities within the Park and in nearby communities.

b. Seasonal Variation

The generation of solid waste in the study area fluctuates dramatically from season to season. As discussed previously, there are two primary sources of wastes generated in the area: 1) the conventional wastes generated by the permanent residents and the associated commercial establishments; and 2) the wastes resulting from the tourism activity in the

area. From the consultant's experience in monitoring the generation of solid waste in areas of Montana where detailed waste quantity data has been recorded, it can be assumed that the generation of the conventional solid waste in the summer is approximately 25 percent above average. This is primarily due to the seasonal disposal of demolition debris, etc. Likewise, the generation of the conventional wastes in the winter months is approximately 25 percent below average. This seasonal fluctuation is graphically depicted in Figure 5.

With regard to the generation of the tourist-related wastes, it is quite apparent that the majority of these wastes are generated in the summer months. Through the Consultant's research, it has been estimated that almost all of the tourist-related wastes disposed of in the study area are generated from Memorial Day to Labor Day. Correspondingly, approximately 95 percent of the tourist-related wastes in Glacier National Park are generated during this summer period. Obviously, however, there are a few unique situations in the study are where this seasonal fluctuation is not valid.

c. Projected Waste Quantities

1) Conventional Wastes

Based on the waste generation rates which were determined to be applicable for this project, future quantities of solid waste generated in the study area were estimated by multiplying the appropriate waste generation rate by the projected populations of the study area through the year 2000. The population projections and waste generation rates utilized may differ dramatically within the next twenty years, which will affect these projections. However, at this time it is felt that the current generation rates and projected populations are most reasonable. It is estimated that by the year 2000, approximately 4,100 tons of conventional solid wastes will be generated annually in the study area.

2) Tourist-Related Wastes

Projections of the future quantities of solid waste generated by tourism within the study area must be examined to properly size solid waste services and facilities. Factors which provide a basis for projecting future tourist-related waste quantities include historical and projected visitation statistics for Glacier National Park and planned expansion of tourist facilities within the study area.

Tourism within the study area is expected to remain extremely dependent upon the visitation to Glacier National Park. Historically, visitation to the Park has generally increased; however, in recent years visitation has fallen off somewhat. National Park Service representatives estimate that visitation will remain relatively constant at approximately 1.5 million visitors annually. Discussions with the NPS, local officials, and other private businessmen revealed that no major

TABLE 1

CURRENT STUDY AREA WASTE QUANTITIES
(Tons)

WASTE GENERATION SOURCE	Jan.	Feb.	Mar.	Apr.	Peak Season May	 June	 July	 Aug.	 Sept.	Oct.	Nov.	Dec.	Annual Total
Permanent													
Conventional Waste (Res. - Comm. - Indus.)	189	235	295	338	324	324	409	377	367	299	224	179	3,560
Seasonal													
1. Glacier National Park	1	1	1	1	8	33	41	46	28	2	2	1	165
2. Concessionaire Facilities	Closed					34	52	52	37	Closed			175
3. Major Private Concerns:*													
a) Tribal Campgrounds	—	—	—	—	1	4	8	7	3	—	—	—	23
b) Other Campgrounds	—	—	—	—	3	10	19	18	7	—	—	—	57
c) Motels	—	—	—	—	4	14	26	25	9	—	—	—	78
4. Other:													
a) Border Ports	Minimal					1	1	1	1	1	Minimal		5
b) Highway Department	Minimal				3	6	9	7	5	Minimal			30
Subtotal: (Seasonal)	1	1	1	1	19	102	156	156	90	3	2	1	533
TOTAL:	190	236	295	339	343	426	565	533	457	302	226	180	4,093

* Minimal wastes generated during off-peak season. Any wastes generated will be considered as conventional commercial wastes.

Seasonal Variation in Solid Waste Quantities

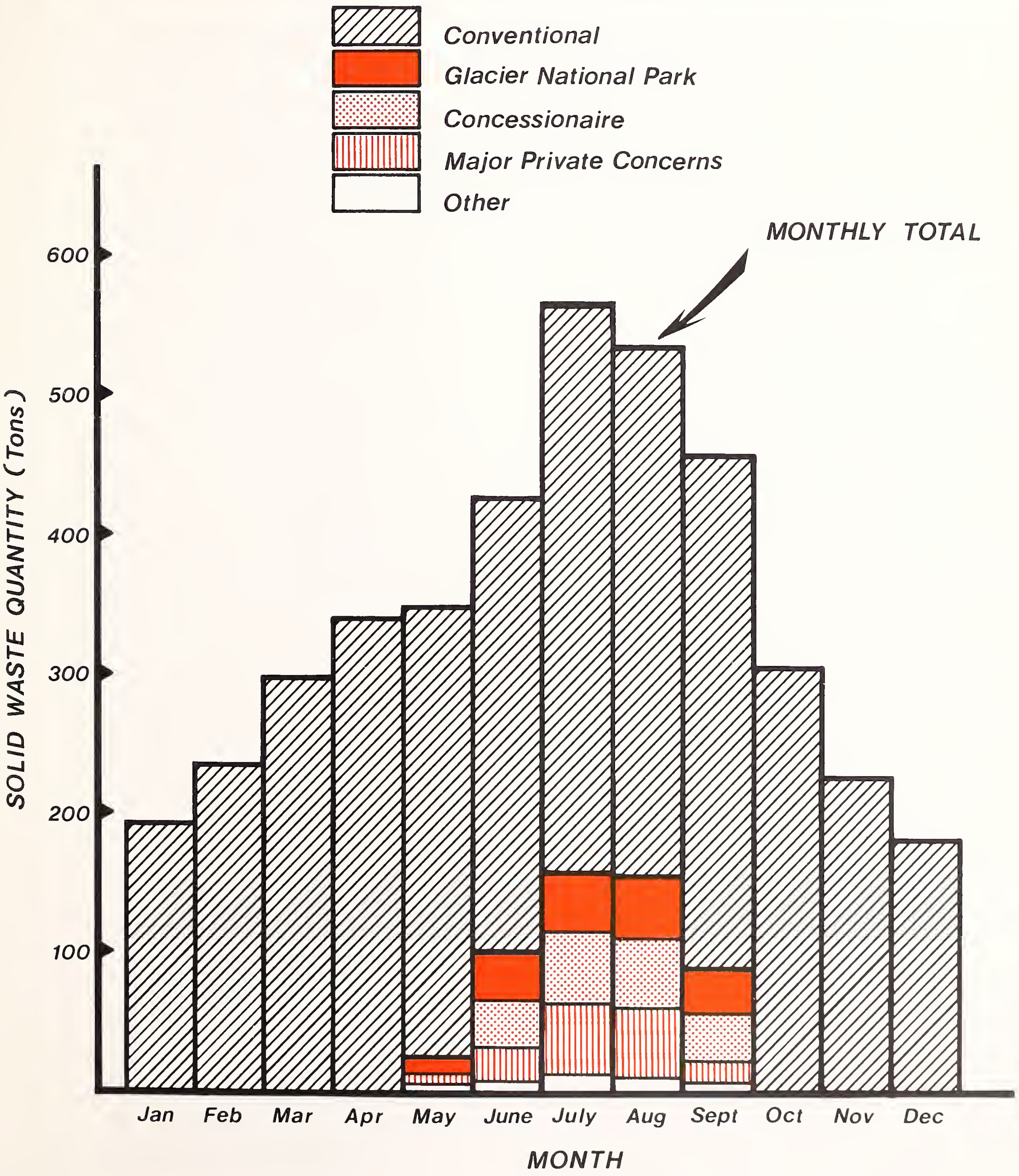


Figure 5

expansion of study area tourist facilities is planned at this time. Based on this information, it is estimated that the quantity of solid waste generated by tourism in the year 2000 will be similar to the current quantity of tourist-generated wastes. It is extremely difficult to project the future quantities of solid waste, since changes in the energy situation or National Park Service policy could dramatically affect the use of study area tourist facilities.

3) Total Study Area Waste Quantities

It is estimated that approximately 4,700 tons of solid waste will be generated annually in the study area by the year 2000. This represents approximately a 14 percent increase in solid waste quantities over the next 20-year period.

PART FOUR

RECYCLING FEASIBILITY ANALYSIS

PART FOUR

RECYCLING FEASIBILITY ANALYSIS

A. GENERAL

The primary objective of this section of the study is to identify and evaluate existing and potential markets for recoverable materials in the solid waste generated in the study area. The information obtained from this investigation will be used to determine the potential of implementing recycling and/or resource recovery strategies within the area of study. The potential for implementing a solid waste recycling program is directly dependent upon markets for the recoverable materials. Revenue from the recoverable materials must be obtained to offset the costs of collecting and separating the wastes in most cases. If revenues for the recoverable materials cannot be obtained, other methods of disposal will be more economical.

Historically and at the present time, the markets for recoverable materials have shown significant fluctuation. The fluctuations may be attributed to a number of outside forces. Among these are 1) supply and demand for specific materials; 2) strikes in virgin material industries; 3) governmental influences through tax or price incentives; 4) foreign purchases; and 5) transportation costs. In general, markets for recoverable materials have shown an upward trend similar to that of most other commodities. Although future prices are extremely difficult or impossible to predict, it would be reasonable to expect this trend to continue. In addition to the economic factors, environmental, technological, political and sociological forces are emphasizing recycling programs as a desirable and practical alternative to conventional solid waste disposal. The extreme fluctuations in price and quantities are lessened in magnitude and frequency as the market for recoverable materials increases. When prices are adequate enough to make recycling attractive, many individual waste generators practice recycling. When the market drops below a certain economic level, these recycling materials become solid waste.

B. TYPES AND QUANTITIES OF RECOVERABLE MATERIALS

An important factor that must be determined prior to the evaluation of the feasibility of recycling solid wastes is the quantity and composition of wastes generated in the study area. Generally there are two types of recoverable materials found in solid wastes: 1) secondary materials that can be reused, such as newsprint, corrugated paper (cardboard) glass, and metal containers; and 2) those materials which can be used as a fuel source to generate steam, electricity and/or heat. The analysis included in this chapter summarizes the feasibility of recovering those secondary materials generated in the area. The analysis evaluating the feasibility of utilizing solid waste as an energy source will be included in Part Six.

In most instances, the recoverable secondary materials that are practical to recycle are limited to ferrous and non-ferrous metals, separated newsprint and cardboard, and glass. In some instances, other materials such as clothing, rubber and wood products are economically recoverable. However, these instances are uncommon and will not be investigated to a great degree in this study.

The estimated quantities of recoverable secondary materials generated in the study area are depicted in Table 2. The quantities of materials depicted are based on the waste generation information developed in Part Two of this report and the waste composition data that was determined applicable from the state-wide solid waste study conducted in 1976. As the table indicates, approximately 242 and 41 tons of recoverable ferrous and non-ferrous metals, respectively, are generated in the study area annually. Also, 769 and 315 tons of paper and corrugated, respectively, are generated and potentially recoverable annually. If market conditions are favorable, it is anticipated that a majority of this material could be recovered economically and effectively.

C. MARKET ANALYSIS FOR SECONDARY MATERIALS

A review of potential buyers for materials that may be recovered from the study area's solid waste indicates that real markets presently exist for many products. Before some materials gain acceptance and are in demand in the marketplace, however, new developments must occur within the industry to make these commodities attractive. In most cases, the recovered materials must meet strict specifications set down by industry in order to command the highest market price. In all cases, a recycling program should be designed to be flexible enough so that if one market slows down or fails, any single unit process for a commodity can be discontinued or shifted to another market without disrupting the future of the program. During such a slowdown, it would be useless for the program to continue to recover that product if no other market was available. In some situations it may also be profitable to stockpile the material awaiting a favorable change in market conditions rather than to discontinue collection of the materials.

The basic objective of the product identification and marketing portion of this study was to identify the various potential buyers who exist for the products which could conceivably by separated from solid wastes within the study area. It is apparent that a large array of products could possibly be recovered from the solid waste generated in the area. In order to explore the market potential of the alternative products more efficiently, these products were grouped into several major categories: 1) ferrous metals; 2) non-ferrous metals: 3) glass; and 4) paper products. The first task in this analysis was to identify the major processes used in the recovery of the material and the uses the material may serve. Then local markets, other Montana markets and national or regional markets were addressed for each of the major categories.

TABLE 2

SUMMARY OF TOTAL WASTE COMPOSITION
FOR
STUDY AREA

(Tons Per Year)

Characteristic	Average Percent[1]	Estimated Current Quantity	Year 2000 Projected Quantity
Combustibles:			
Paper	18.8	769	884
Cardboard	7.7	315	361
Other	31.7	1,298	1,490
Subtotal	58.2	2,382	2,735
Non-Combustibles:			
Ferrous	5.9	242	278
Non-Ferrous	1.0	41	47
Glass	4.3	176	202
Other	30.6	1,252	1,438
Subtotal	41.8	1,711	1,965
TOTAL:	100%	4,093	4,700

[1] Source: "Population, Employment and Waste Generation Report" prepared for the State of Montana Department of Health and Environmental Sciences, 1976.

1. Recovery Processes

a. Ferrous Metals

Basically, there are two processes for the recovery of ferrous materials from solid wastes: chemical processing and remelting. Chemical processing is intended to extract primarily tin and copper from ferrous materials. Detinning is an industrial process which recovers tin from tinplated steel cans, and which generally yields about seven pounds of tin from each ton of scrap cans. Copper precipitation involves the leaching out of copper from reclaimed steel cans; presently, this process is one of the few economically feasible methods of recovering copper from low-grade materials.

In addition, steel scrap may be remelted in steel furnaces and iron foundries and used to produce new steel products. The main source of remelting material, steel cans, may not be a desirable raw material due to the low density of the scrap and non-ferrous contaminants. Other ferrous scrap such as white goods, appliances, automobiles, and similar materials are denser and are better suited for the remelting process. Steel can scrap may also be used to produce ferro-alloys when the iron is combined with controlled quantities of other elements. The resulting material is then used as an additive in melts for alloy steel and castings.

b. Non-Ferrous Metals

Although non-ferrous metals, comprised primarily of aluminum, represent less than one percent of the municipal solid waste, once separated these materials become extremely valuable and numerous markets exist.

After the general metal waste has been shredded and ferrous metals have been magnetically removed, two processes are generally used to isolate the aluminum fraction of the resultant material. The first procedure employs chemicals which are directly added to a suspension in which the aluminum is sitting. Recoverable aluminum, comprised of numerous aluminum alloys and other light metals, will separate itself by collecting on the surface. The aluminum isolated in this way can be marketed; however, the quality of the material is reflected in low market prices. The aluminum fraction found primarily in beverage cans may be isolated by eddy current separation, a process that essentially uses "aluminum magnets" to attract recoverable aluminum. This material is a single alloy and has a relatively high market value. The aluminum recovered by both processes and other scrap aluminum is remelted and cast directly into ingots for use in making new cans and other products.

Mixed non-ferrous metals account for a small portion of the total non-ferrous metals that can be recovered from solid waste. This portion of the waste consists of small amounts of copper, lead, zinc, brass and other metals. Each of these metals is valuable by itself, but extensive processing is required to recover individual non-ferrous metals. Cur-

rently, the recovery of these metals by processing is not economically feasible.

c. Glass

Certain types of glass which are contained in municipal solid waste may be recovered, remelted, and used in the manufacture of new glass products. Most glass manufacturers readily accept the scrap glass, or cullet, because its use reduces fuel consumption and aids the melting process by liquifying at lower temperatures than new materials. Color and purity requirements established by glass manufacturers limit the recovery of glass to some extent. The only reliable method of insuring the quality of the recovered glass is by manual sorting, an expensive and time-consuming process. Unsorted crushed glass scrap has been utilized in some areas as an aggregate in the production of asphalt and other building materials.

d. Paper Products

Waste paper products may be recovered by several different methods which include: 1) direct recovery by the paper industry; 2) manual segregation of selected papers by consumers; 3) mechanical processing of municipal waste to recover fiber material; and 4) conversion to usable forms of energy by processing the paper along with other post-consumer wastes. Recovered paper is primarily used for the manufacture of building products and for repulping. The operations that use waste papers as a raw material are extremely concerned about levels of contaminants such as plastics, metals, and oils, which have serious effects on some manufacturing processes. It is very probable that some recycled papers could not be acceptable for uses such as food packing because of public health concerns.

In general there are three major types of waste paper that are easily recoverable. These types include:

1) Used containers, both solid fiber and corrugated (cardboard);
2) News, which includes newspapers and special types of newsprint;
3) Mixed papers, primarily mill wrappers, computer cards and printouts, book stock, and magazine papers.

2. Secondary Materials Markets

For the purposes of this report, inquiries were made to three levels of secondary materials markets: national, state, and local outlets. Several national and state industrial and trade associations were contacted and potential buyers of these materials were identified from each association's membership. As the list of potential buyers increased, specific inquiries were formulated regarding the required material specifications, the capacity each potential buyer might have for recovered materials, and the pricing structure associated with each of the potential products. Included herein is a summary of the market investiga-

tions which were conducted to determine the feasibility of recovering secondary materials from the solid wastes generated within the study area. Prices included in the following tables reflect 1981 commodity markets.

a. Ferrous Metal Markets

On the national level, some interest was shown by Midwestern markets in purchasing ferrous materials which could potentially be recovered from solid waste generated in the study area. Utilization of these markets is not currently profitable due to the long haul distances and the high freight and handling costs required to transport the material to the nearest plant locations.

Markets for secondary ferrous materials within Montana consist primarily of scrap metal dealers, and those contacted expressed considerable interest in purchasing recovered ferrous materials. One industry, ARCO, located in Butte, is presently operating a copper precipitation plant and utilizes substantial quantities of shredded and detinned ferrous metals in its process. Officials indicated that they could be considered a potential market for this type of ferrous material if quantities were large enough and high standards could be maintained. Local and area markets that have indicated an interest in purchasing certain types of ferrous scrap metal include:

Pacific Hide & Fur (Great Falls-Cut Bank):	Cast/Scrap Iron ($20-$40/Ton)
Pacific Iron & Metal (Kalispell):	Cast/Scrap Iron ($20-$40/Ton)
Carl Weissman & Sons (Great Falls):	Cast/Scrap Iron ($16-$30/Ton)
Flathead Ind. for the Handicapped (Kalispell):	Steel cans ($.08/lb.)

b. Non-Ferrous Metal Markets

In regard to potential markets for the recoverable non-ferrous metals generated within the study area, it was determined that definite national markets exist for these materials. Several firms from the Pacific Northwest expressed interest in these materials; however, high transportation and handling charges effectively prevent the use of the markets at this time.

Numerous state and local outlets exist for recovered non-ferrous metals, primarily because each metal is relatively valuable. Aluminum, copper, brass, and to some extent lead are most often purchased by scrap metal dealers. The price paid for each metal is dependent upon the quantity and the amount of contaminants each recovered material contains. The most favorable local and area markets are summarized as follows:

Carl Weissman & Sons: (Great Falls)	Aluminum ($.20-.30/lb.) Brass ($.27-.35/lb.) Copper ($.40-.50/lb)
Pacific Hide & Fur: (Great Falls - Cut Bank)	Aluminum (cans & scrap) $.20-.30/lb. Brass (red & yellow) $.30-.40/lb. Copper (No. 1 & 2) $.45-.60/lb.
Pacific Iron & Metal: (Kalispell)	Aluminum (cans & scrap) $.20-.30/lb. Brass (red & yellow) $.27-.35/lb. Copper (No. 1 & 2) $.45-.55/lb.
Great Falls Recycling:	Aluminum (cans & scrap) $.08-$.30/lb.
Flathead Ind. for the Handicapped: (Kalispell)	Aluminum cans, $.25/lb.
Pennington's, Inc.: (Shelby)	Aluminum cans, $.25/lb.
Shelby Distributors: (Shelby)	Aluminum cans, $.25/lb.

In addition, a resident of Browning currently purchases aluminum beverage cans from local residents for resale at a later time.

c. Glass Markets

An investigation into the location of glass container manufacturing plants indicated that very few glass manufacturing industries are close enough to Montana to be considered potential markets. The Owens-Illinois Corporation operates two glass container plants in the Pacific Northwest which accept large quantities of recovered glass. Again, it is not feasible to utilize this market due to high transport and handling costs.

The most favorable local markets exist with the recycling centers and beverage distributors located in Great Falls and Kalispell. These outlets accept only specific types of beverage bottles. The following area markets appear to be the most favorable outlets for certain types of beverage bottles:

Great Falls Recycling:	Selected bottles ($.25 or .50/case)
Flathead Ind. for the Handicapped: (Kalispell)	Selected bottles ($.25 or .50/case)

d. Paper Markets

Markets for recovered waste papers, including newsprint, corrugated and other types of mixed papers are extremely favorable. Numerous outlets for these materials exist within the region and the state of Montana. Firms located in eastern Washington and in Utah both expressed interest in purchasing recovered materials. The paper market fluctuates a great deal and at the present time it is not economical to use these regional markets because of transportation costs.

Numerous outlets for waste paper within the State of Montana may be utilized effectively. Two firms located in Great Falls use newsprint throughout the year. Currently, the price being paid for newsprint is quite low, a reflection of the trend being experienced by the building industry. Great Falls Recycling accepts newsprint and other types of waste paper and provides the most favorable outlet for recovered paper. The following listing summarizes the most favorable outlets for waste paper materials potentially recoverable from waste generated within the study area:

Great Falls Recycling:	Newsprint & Ledger ($0.01 to 0.02/lb) Computer Cards ($0.05/lb) Computer Printout ($0.04/lb)
Robinson Insulation: (Great Falls)	Newsprint ($20/Ton)
Allweather Insulation: (Great Falls)	Newsprint ($20/Ton)

Market prices for newsprint and corrugated papers increase significantly if large quantities of clean materials are available and if the density of the waste paper is increased by baling. In most cases, the material must be delivered to the plant location.

D. SUMMARY OF RECYCLING FEASIBILITY

Included in the following narrative is a summary of current recycling efforts and a discussion of the potential for economically recovering and marketing secondary materials found in the study area's solid waste stream.

1. Ferrous Metals

Due to the small quantity of ferrous materials (242 tons per year) annually generated within the study area and the long distances between the study area and Midwestern consumers, utilization of regional markets is prohibitive at this time. This fact makes the utilization of local or area markets the most feasible alternative.

Currently, efforts to recover ferrous metals within the study area consist of voluntary recycling on an individual basis. Ferrous materials, primarily scrap metal and junk vehicles, may be transported to outlets in Browning or Cut Bank. An auto salvage yard is located in Browning, and three similar outlets are located in Cut Bank.

2. Non-Ferrous Metals

Regional markets for non-ferrous metals exist in the Midwest and on the West Coast; however, the high transportation costs associated with shipping non-ferrous metals from the study area to these regional markets make their utilization not economically feasible at this time.

However, numerous state and local markets exist for non-ferrous materials generated within the study area, primarily because of the value of many of these metals. Although only 42 tons of non-ferrous metals are generated in the study area, the favorable price structures of the non-ferrous metals markets provide the largest incentive for recovery of these metals.

Currently, voluntary recycling of non-ferrous metals, primarily aluminum beverage containers, is practiced within the study area. Many individuals regularly collect beverage containers and return them to beverage distributors or scrap metal dealers located in Cut Bank, Shelby, Great Falls or Kalispell. A local resident of Browning has purchased aluminum cans from other residents of the study area for ultimate sale to area scrap metal dealers. Private organizations or clubs have undoubtedly collected these materials for fund-raising projects within the study area.

3. Glass

Currently, the potential for the recovery of most types of waste glass is relatively low. Although regional markets in the Pacific Northwest expressed interest in obtaining waste glass from the study area, available quantities of glass and the market prices do not offset transportation charges. Utilization of area markets is the most practical alternative. Glass recycling within the study area consists solely of voluntary efforts. Selected beverage bottles are purchased by area recycling centers or beverage distributors in Kalispell and Great Falls.

4. Paper Products

Although national and regional markets do exist for some paper products, it appears more feasible to utilize the markets within the state. As previously mentioned, several operations within Montana utilize newsprint in the manufacture of cellulose fiber insulation. At this time, no efforts to recycle waste paper are known to exist within the study area. Prices in the paper market are dependent upon the building industry and are extremely variable. Sufficient outlets exist within the state to purchase many types of paper products during all market conditions. It is anticipated that recycling of newsprint or corrugated by individuals or groups would be initiated if market conditions were favorable.

At the present time, resource recovery options for the study area appear limited. Due to the relatively small quantities of recoverable materials generated annually within the study area, the distance to regional markets, and in many cases the present market pricing structure, development of an extensive resource recovery program is not seen as feasible for the study area. Markets for non-ferrous metals, primarily aluminum, have consistently improved in recent years and implementation of a recycling program based on these recoverable materials would appear to be the most feasible option. During favorable market conditions, a recycling program based on recoverable paper may be feasible.

PART FIVE

ANALYSIS OF SPECIAL WASTES

PART FIVE

ANALYSIS OF SPECIAL WASTES

A. GENERAL

The quantity and composition of solid waste varies considerably around the State of Montana and within the study area. Although various portions of the study area generate different types and quantities of solid waste, the conventional portion (residential and commercial) of the total waste generated has similar composition characteristics and is generated in about the same per capita quantities throughout the study area and the state. These wastes are estimated to comprise approximately 90 percent of the total waste generated. It is the remaining ten percent of the wastes which varies the most in composition from area to area. These "special" wastes are responsible for many of the solid waste management problems generally experienced, because most require special handling and disposal. It should be emphasized that regardless of the waste handling alternative that is implemented, provisions and/or handling facilities which are compatible with the selected solid waste management system must be made available for the remaining special wastes.

In order to determine the proper disposal method for these "special" wastes, it is first necessary to classify them according to waste type. During May, 1980 the federal government through the Environmental Protection Agency (EPA) published waste classification, handling and disposal guidelines which categorized solid waste into hazardous and non-hazardous wastes. The State of Montana generally classifies wastes according to the guidelines established by the EPA. Under the current State regulations, all wastes categorized by the EPA as hazardous are considered Group I wastes by the State and must be disposed of at a Class I disposal site. The State further classifies all decomposable wastes, excluding hazardous wastes, as Group II, and requires that these wastes be disposed of at a conventional sanitary landfill (Class II site). According to state regulations, all other materials such as construction debris, wood wastes and inert materials are classified as Group III materials and can be disposed of in a Class III disposal site (demolition and fill site).

Included in the following section of this report is a brief evaluation of the existing disposal regulations and practices, and suggestions for the proper disposal of numerous "special" wastes generated within the study area. Obviously, there are other types of wastes produced within the study area that present occasional problems to local officials and residents; however, in most instances these problems may be solved on a case-by-case basis and do not warrant extensive analysis at this time. The following narrative contains a brief summary of the information obtained and the

recommendations for handling and disposal that were formulated for each type of waste analyzed.

B. ANALYSIS OF INDIVIDUAL WASTE TYPES

1. Septic Tank Pumpings

Significant quantities of septic tank pumping are generated within the study area each year. Septic tank systems are commonly used throughout the study area because municipal treatment facilities are available only in Browning, Cut Bank and other small communities. Quantities of septic tank wastes are also generated within the study area by tourists travelling in self-contained camper units. Currently, the septic pumpers operating in the study area are disposing of these septic tank pumpings in one of the municipal sewage systems located in the area.

According to the current EPA guidelines, septic tank pumpings are considered to be non-hazardous and may be deposited in a conventional sanitary landfill (Class II landfill). Municipal sewage sludge and non-hazardous industrial sludges may be disposed of in a similar fashion, providing proper treatment has occurred. State of Montana regulations mandate that special use permits be obtained before these materials are disposed of at a Class II site. The operational procedures and environmental conditions of each site must be evaluated before State approval is granted.

a. General Disposal Practices

As previously mentioned, disposal of septic tank pumpings may occur at Class II landfills if State approval is granted. Currently, very few landfills within the state have obtained permission to dispose of this material. Any landfill which presently accepts such materials and does not have licensed approval is not operating in strict compliance with the law. Numerous cases of indiscriminate dumping of septic tank pumpings occur throughout the state each year. This practice is not only unlawful but also quite hazardous, due to the potential for groundwater pollution and public health problems.

b. Recommended Disposal Procedures

It is recommended that septic tank pumpings be disposed of at an existing sewage treatment facility, where the material may be integrated into the treatment process. The disposal of septic tank pumpings directly into wastewater treatment lagoons is an acceptable disposal method. Wastewater treatment facilities are available at Browning, Cut Bank, and several smaller communities within the Reservation, including Starr School, Heart Butte, Last Star, and the Blackfeet Boarding Dormitories. Existing wastewater treatment facilities can adequately accept the quantities of septic tank pumpings generated within the study area. Septic wastes from self-contained camper units may be disposed of at several major campgrounds or at gas stations equipped with large holding tanks. Chewing Blackbones Campground, for example, is equipped with a sewer system

and its own lagoon. Alternate methods of septic tank pumpings disposal include: land spreading, drying in shallow evaporation ponds, and disposal at licensed landfill sites.

2. Dead Animals

a. General Disposal Practices

The number of dead animals, both domestic agricultural animals and game animals, varies throughout the year. Animal losses may occur during calving and lambing season when weather conditions are critical to many newborn animals. Hunting season also produces numerous instances of carcass abandonment. State law prohibits the placing of all or any part of a dead animal in any water body, road, street, alley, lot or field. It is also unlawful to place all or part of a dead animal within one mile of the residence of any person unless it is burned or buried at least two feet underground. Dead animals are classified as a Group II waste and may be disposed of at a Class II landfill site if special procedures are followed. These special procedures include supervised placement in a segregated pit that will receive at least two feet of cover the same day the dead animal is deposited.

Several methods of disposal currently practiced are in compliance with present State regulations. These include proper disposal of the carcass at rendering plants, and disposal at Class II landfills. Each of these techniques, if properly administered, will contain and restrict any of the potentially harmful constituents of the waste.

b. Recommended Disposal Procedures

Based upon conversations with State officials and examination of State regulations, the best method of carcass removal and disposal is by a rendering operation that is licensed and meets the Montana Department of Livestock requirements for such operations. In most instances, the rendering service will provide free pickup and delivery if the number of animals and transportation distances make this economical. Currently, several rendering companies in the state provide disposal service for dead animals. The names, locations and phone numbers for each company are listed below:

NAME	LOCATION	TELEPHONE NO.
Billings Rendering Co.	Billings, MT	248-8410
Dillon Rendering Co.	Dillon, MT	683-2812
Miles City Rendering Co.	Miles City, MT	232-1956
Rocky Mountain Rendering Co.	Great Falls, MT	454-1953
Western Montana By-Products, Inc.	Missoula, MT	543-8291
Silver Bow Recyclers	Butte, MT	782-2740

The second most desirable disposal method for dead animals is by burial by individual owners on their own property. This method in most instances is the least costly due to low transportation and handling costs. A third acceptable disposal method is burial at state-approved sanitary landfills (Browning or Cut Bank) where proper handling procedures are employed and supervision is provided.

3. Bulky Materials

a. General Disposal Practices

Bulky wastes consist primarily of discarded appliances (white goods), demolition debris materials (rock, brick, concrete), and numerous types of wood wastes. According to State guidelines, these inert materials are non-water soluble and are classified as Group III wastes and may be disposed of at Class III sites. Currently, very few licensed Class III sites exist within the state; therefore, most of these materials are disposed of at Class II sites. Most landfills accept these materials and separate areas of the site are set aside for specific types of bulky items. This stockpiled material in some cases may be sold to scrap metal dealers for salvage. Some white goods may be crushed and removed under the administration of the county-wide junk vehicle program, which is discussed in this section. If conditions permit, the vehicle crusher may crush and transport the white goods with crushed vehicles. Other materials such as concrete, stone or dirt may be utilized as fill material. Instances of disposal in violation of State guidelines occasionally occur; the most common offenses involve the burning of the combustible fraction of the bulky materials, primarily wood wastes, or indiscriminate dumping of the materials.

b. Recommended Disposal Procedures

After examining the existing state laws regarding disposal of bulky materials, it is apparent that most of the existing disposal practices are in conformance with the laws. The recommended disposal procedures for bulky materials include: 1) proper disposal at a Class III site; 2) disposal at a licensed Class II disposal site; and 3) salvage of the usable portion of the bulky materials (use of stone, concrete or dirt for fill materials is a good example).

4. Used Tires

a. General Disposal Practices

It is estimated that within the State of Montana, more than 680,000 used tires are generated each year, based upon a national average of 1.14 waste tires per registered motor vehicle per year. This represents a substantial amount of waste materials which must be disposed of annually. Tire composition has changed over the years and the primary non-rubber constituents currently found in tires are woven steel belting, fiberglass belting, polyester cord, and steel bead wires. According to State laws,

used vehicle tires are classified as Group III wastes and may be disposed of at Class II or Class III disposal sites.

Tires may be processed before disposal in order to eliminate problems associated with handling and disposal. Processing may be accomplished by shredding, slicing or by cryogenic procedures, where materials are subjected to sudden drops in temperature and are ultimately shattered. These processes substantially reduce the volume of the tires, which in turn reduces transportation and handling problems. Processes also increase the chance that some or all of the used tire constituents may be recovered. Currently, the processed tires may be utilized as an additive to asphalt paving materials or as an energy source.

Currently, the most common method of used tire disposal within the study area and the state consists of stockpiling or burial in sanitary landfills. Unless properly positioned in the landfills, however, the tires will eventually work up to the surface. The majority of waste tires placed in landfills are not properly buried, and periodic problems are experienced.

b. Recommended Disposal Procedures

Several alternate methods for used tire recovery and disposal have been utilized over the last few years with success in various areas of the nation. The most common fate of approximately one-third of the used tires is recapping. Large tire companies collect used tires from local tire dealers and recap them at plants located within the state. Recapping partially solves the used tire problem; however, there are many waste tires not suitable for recapping that must receive proper disposal.

Based upon the investigations conducted for this report, it is recommended that waste tires be recycled by one of the methods previously mentioned to the highest degree possible. If recycling tires is not feasible, these materials should be buried or stockpiled at the sanitary landfills in Browning or Cut Bank. Burial of tires, although difficult, may be the most practical method of tire disposal within the study area. Stockpiling tires at landfills within the study area for ultimate disposal at a large tire dump near Kalispell may prove to be an effective means of reducing problems associated with used tire handling and disposal. The facility in Kalispell will accept all tires; however, the owner will not offer payment for the tires or arrange for transport of used tires to the site. The owner of this recently opened facility intends to use the tires as a fuel source at some future date. It should be noted that there are some drawbacks to stockpiling tires for a long period of time. These drawbacks primarily include the potential for providing breeding grounds for skunks, snakes, mosquitos, etc. Therefore, these drawbacks should be evaluated prior to stockpiling tires for extended periods.

5. Scrap Automobiles

a. General Disposal Practices

A scrap automobile can be defined as a derelict, unused, inoperable automobile with little or no value. Based on national averages, it is estimated that the motor vehicle survival rate decreases from 95 percent after six years in service to less than 20 percent after 14 years of service. During its "life cycle", a motor vehicle will pass from a transportation unit to a valuable source of spare parts for other vehicles and ultimately to a source of scrap metal to be reused by the metal industry.

According to State law, abandoned automobiles are classified as a Group II waste and may be disposed of at a Class II landfill. Due to the large amount of space required for storage of junk vehicles at disposal sites and problems encountered with burial of automobiles, many landfills do not accept junk vehicles.

b. Junk Vehicle Disposal Program

A statewide junk vehicle disposal program was implemented in July, 1973. The program is financed by several sources: 1) the sale of junk vehicles; 2) a $.50 fee levied on all vehicles registered in the state; 3) a licensing fee levied on all wrecking facilities; and 4) a title transfer fee of $1.50. Under this program, funds are provided to counties for planning programs as well as operation costs. Each county may determine the type of program it feels best suits the needs of the county residents. Assistance to each county is provided by the State. The program stipulates that each junk vehicle graveyard must have a minimum of two acres of land and must be properly shielded from public view. After 200 vehicles have been accumulated at each graveyard, a contract is obtained with a scrap dealer to dispose of the vehicles. The profit obtained from the sale of the junk vehicles is then placed in the state's earmarked revenue account.

Glacier County currently has one licensed junk vehicle graveyard located at Cut Bank as well as a privately owned junk vehicle wrecking facility. The county junk vehicle program is administered by the Glacier County Road Department. Junk vehicles are transported to a county yard where they are stockpiled until 200 vehicles have been accumulated and contracts have been let for crushing and removal. Since the adoption of the county-wide junk vehicle program, at least 400 vehicles have been crushed and removed from the Cut Bank vehicle graveyard. The Blackfeet Tribe has adopted a junk vehicle ordinance similar to the State of Montana's guidelines for junk vehicle disposal. The ordinance establishes: 1) the standards for licensing junk vehicle graveyards; 2) the criteria for shielding the facilities from public view; and 3) the procedures necessary for junk vehicle collection and disposal. The Tribal program is administered in conjunction with the Glacier County junk vehicle program.

c. Recommended Disposal Procedures

It is recommended that every attempt be made to dispose of junk vehicles at either the licensed junk vehicle wrecking facility in Cut Bank or the free licensed junk vehicle graveyard in Cut Bank.

6. Hazardous Wastes

Many wastes produced by agriculture, industry, hospitals and government may be hazardous and may require special precautions during transport, hauling and disposal. The EPA estimates that within the United States, only ten percent of the hazardous waste generated annually is managed in an environmentally safe manner. The remainder is handled in a fashion which could potentially threaten human health and the environment.

The Environmental Protection Agency is responsible for the safe management of hazardous wastes. In May of 1980, this agency released a revised set of guidelines pertaining to hazardous waste materials. The regulations included criteria for the determination of hazardous solid wastes and hazardous waste generators; rules for transporting and disposing of the materials; and a comprehensive listing of hazardous wastes. Any solid waste which exhibits any of the characteristics of hazardous waste (i.e., ignitability, corrosivity, reactivity, and toxicity) is subject to the revised EPA regulations.

These guidelines determined a level of hazardous waste generation for individual generators that is most effectively managed by the agency. Any individual who accumulates, produces, or disposes of a waste classified by the EPA as hazardous at a rate greater than 1,000 kilograms per month (2,200 lbs/month) is subject to the EPA guidelines for hazardous waste management. (This standard does not apply to farmers or ranchers.) Generators of 1,000 kg/month or less of hazardous waste may dispose of the material at an on-site facility or must ensure delivery of the material to an off-site treatment, storage or disposal facility licensed by the State to manage municipal or industrial solid waste. In addition, special regulations apply to individuals or operations which generate more than one kilogram per month of wastes categorized by the EPA as "Acute Hazardous".

The Environmental Protection Agency guidelines for hazardous waste management provide the basis for the State of Montana's hazardous waste policies. Wastes classified as hazardous by the State are the same as those classified by the EPA as hazardous. Hazardous waste generators and disposal facilities are required to notify the State regarding the type, quantity and composition of the waste material being handled, and may be required to keep pertinent records regarding the generation, transport and disposal of the hazardous waste. In addition, transporters of hazardous waste materials and hazardous waste disposal facilities must be licensed by the State, and must operate in a manner consistent with state and federal guidelines.

According to State regulations, hazardous wastes must be disposed of at a Class I site. Currently, no Class I sites are located within the State of Mon-

tana; however, some on-site disposal of hazardous waste material by industry does occur. The nearest hazardous waste disposal sites are located in Idaho and Oregon. Information regarding hazardous waste disposal at these sites may be obtained by contacting the following firms:

Wes-Con, Inc. (Idaho): (208) 834-2275
Chem Security Systems, Inc. (Oregon): (503) 223-1912

It should be stressed that the Solid Waste Management Bureau of the State Department of Health and Environmental Sciences has the primary responsibility for the safe management of hazardous wastes, and should be contacted prior to the handling and disposal of such materials. Procedures for proper transport, handling and disposal of hazardous wastes can be determined by State officials on a case-by-case basis.

The following narrative identifies the existing and recommended disposal practices for the more commonly generated hazardous waste types within the study area.

a. Pesticides and Pesticide Containers

1) General

Because of the agricultural nature of a considerable portion of Glacier County, it is expected that significant amounts of excess pesticide and pesticide containers are generated within the study area. Proper handling and disposal techniques must be utilized in order to prevent detrimental effects upon the environment and public health. According to State law, no person shall dispose of or receive for disposal any pesticide container or pesticide residue in a manner inconsistent with its labeling or safe disposal criteria and procedures. It is also unlawful to dispose of these materials by burning or by improper dumping.

2) Waste Pesticide Management Program

The Montana Department of Health and Environmental Sciences was involved in a waste pesticide management program from 1969 through the fall of 1978. The State accepted highly toxic or other waste pesticides from throughout the state and transported them to storage bunkers located at the inactive Glasgow Air Force Base in northeastern Montana. In 1978, the pesticides and pesticide containers were transported to a hazardous waste disposal site near Boise, Idaho. The intent of the program was to provide safe storage and disposal. The funds for the program were exhausted and no grant monies are currently available to continue the program.

3) Recommended Disposal Procedures

There are several acceptable methods by which excess pesticides may be disposed of without causing adverse effects on the environment. The most preferred method of disposal is to return the excess material to the

manufacturer, distributor, or to another party capable of using the material. The alternate disposal method is burial at the state-approved landfill sites at Browning or Cut Bank.

Several procedures are recommended for the safe disposal of pesticide containers. Many combustible containers (fertilizer bags, etc.) may be disposed of at Class I or Class II landfills or by incineration in licensed incineration facilities, depending upon the chemical constituents the container held. Burial of many containers may occur on farm premises in areas which will not pollute surface or ground waters. Non-combustible containers (metal pesticide tanks, etc.) should be triple-rinsed, following a procedure prescribed by the Department of Agriculture, to dilute the hazardous material prior to disposal. After the rinsing procedure is completed, metal containers may be disposed of by: 1) returning the container to the dealer of distributor; 2) depositing the container at a scrap metal yard or junk vehicle graveyard which has obtained state authorization to recycle pesticide containers; 3) burying the container in a licensed Class I or II landfill; or 4) burying on-farm in an environmentally safe manner.

b. Used Lubrication Oils

1) General

Based upon studies performed in other regions of the country, it has been estimated that more than two-thirds of the automobile lubrication oil sold ends up as a waste product which is not salvaged or reclaimed. Waste oils are generally disposed of in trash collections, on roadways to control dust, or placed directly in landfills. If special precautions are not taken, this oil may eventually find its way into groundwater sources and may become a pollutant to water supplies. According to state law, petroleum wastes are classified as Group I wastes and should be disposed of in a Class I landfill. EPA regulations allow small quantities (1,000 kg/month or less) to be mixed with quantities of household wastes and disposed of at Class II sanitary landfills.

2) Recommended Disposal Procedures

The most desirable method of reclaiming used oils and other types of waste petroleum products is by means of reprocessing or re-refining. After lubrication oils have been used over a period of time, contaminants such as gasoline, water, heat and cold-resistant additives and dirt collect in the oil. Re-refining processes may remove the contaminants and the resultant product is a lubricating oil similar to the original product.

Several other methods of reclamation may be used to treat waste oils. These include incineration and use as a fuel source, use as road oil, and use as an asphalt constituent. Tests conducted by various industrial groups have demonstrated the feasibility of recovering energy from sever-

al types of waste lubricants. Waste oil may also be used as a supplemental fuel for large boilers. Although road oils have been and are still manufactured from virgin materials, a large amount of this material is comprised of waste oil. Drain oil and distilled drain oil fractions may be used as cutting stock in the production of asphalt. Most of the metallic compounds present in the oil are relatively insoluble and become coated with asphaltic materials. These qualities make the use of waste oil as an ingredient in the production of asphalt relatively attractive.

Based on the analysis conducted herein, it is recommended that all waste oils be ultimately recycled utilizing one of the techniques discussed above. Since there are no re-refining or re-use facilities for used oils located in the study area, it is recommended that collection depots be set up at strategic locations throughout the area where individuals and companies can bring these materials. These collected oils could then be transported to facilities capable of reprocessing or reusing the oils.

7. Hospital Wastes

a. General Disposal Practices

Special wastes generated at hospitals or medical clinics are generally of two types; pathological or bacteriological. Pathological wastes, which include tissues, are generally incinerated at on-site facilities or transported to other hospitals equipped with incineration facilities. Ash resulting from the incineration process in collected and landfilled. Bacteriological wastes, however, receive sterilization procedures and are ultimately landfilled. Some wastes generated by medical facilities are hazardous, such as radioactive wastes, and require special handling and disposal procedures. These procedures are subject to EPA regulations for transport, handling and disposal.

Pathological and bacteriological wastes generated at the Indian Health Service facility in Browning are generally incinerated and landfilled. All other wastes which are not considered "special" are collected twice each week by the High Plains Solid Waste System and transported to the Browning landfill for disposal.

b. Recommended Disposal Procedures

It is recommended that special wastes generated at study area hospitals or other medical facilities be autoclaved or disinfected by other means prior to final disposal at an approved sanitary landfill. Hospital wastes classified as hazardous should be handled and disposed of in accordance with EPA regulations.

PART SIX

EVALUATION OF ALTERNATE SOLID WASTE DISPOSAL SYSTEMS

PART SIX

EVALUATION OF ALTERNATE SOLID WASTE DISPOSAL SYSTEMS

A. ASSESSMENT OF AVAILABLE TECHNOLOGY

The purpose of this section of the study is to identify those solid waste disposal concepts that have been demonstrated and proven effective throughout the state, region and nation and to evaluate in depth those concepts that appear to be applicable for most economically solving the inefficiencies and deficiencies of the existing disposal methods in the study area. Currently in the United States and Canada there are a multitude of concepts being utilized to transfer and dispose of solid waste. In most instances, the local topographic, climatic, sociologic and political conditions dictate which alternatives are most practical and economical for the area. Through a detailed literature search, on-site investigations and the Consultant's past experience, it was determined that five general concepts have potential applicability in the study area. These include:

- Sanitary Landfills
- Intermediate Processes
- Incineration with Heat Recovery
- Transfer Stations
- Rural Disposal Systems

In the following narrative, each concept is discussed and evaluated to determine its specific applicability to this project.

1. Sanitary Landfills

The sanitary landfill has been, since the first federal laws and regulations were administered in the early 1960s, the most widely used waste disposal method in the nation. Generally, a sanitary landfill is a "cut and cover" operation whereby soil is excavated from a side slope or trench and stockpiled. Solid waste is then placed into the excavated area and compacted to a practical degree. Finally, the cover soil is placed as necessary on the compacted waste.

If a sanitary landfill is properly operated and located, it can in most instances be an economical and environmentally sound method for disposing of solid waste. If sanitary landfills are not properly operated and located utilizing sound engineering principles, however, several problems can arise. These include: 1) air, noise and/or groundwater pollution, 2) odor problems, 3) health hazards due to the breeding of rodents and flies, 4) nuisances and aesthetic deficiencies due to blowing paper and litter, and 5) explosion hazards due to methane production.

To protect the residents in the state and nation, the State of Montana and the United States Congress have promulgated laws, regulations and enforcement programs for the proper location and operation of waste disposal sites. Currently, approximately two-thirds of the disposal sites in the state have been licensed by the State Solid Waste Management Bureau (SWMB), which indicates general compliance with the regulations.

A current major problem, according to local and state officials, in regard to the proper location and operation of waste disposal sites is public acceptance. This is quite common not only in Montana but throughout the nation, primarily because of the relatively short time frame in which stringent waste disposal laws and regulations have been in effect. The common practice for the past several decades has been to utilize unsightly, burning pits located either on private property or near each community. With the increasing volume of waste, coupled with the unavailability of land which can be utilized for waste disposal, these past practices are no longer environmentally or socially acceptable. Thus it is the Consultant's opinion that as the population in the study area continues to increase, more public demand will be placed on the local officials to provide acceptable waste disposal services and facilities. The sanitary landfill is definitely one disposal method which, if operated properly, can provide this service in an environmentally safe manner.

2. Intermediate Processes

Currently, there are numerous types of equipment being marketed that process solid waste to a certain degree. The primary purpose for processing waste usually is two-fold; either 1) the topography, climatic conditions or population distribution are such that it is not practical or economical to locate and/or utilize a sanitary landfill using conventional techniques, or 2) the waste's composition or physical conditions must be altered so that all constituents can be recovered and reused. Based on the Consultant's experience, it was determined that two major types of intermediate processes are technologically proven and warrant investigation for use within the study area; these are shredding and baling solid waste prior to disposal at a sanitary landfill. Included in the following narrative is a description of the applicability of these processes to the study area's needs.

a. Shredding

The primary purpose of shredding solid waste is to obtain a material with more uniform properties. Once shredded, the material is better suited for landfilling, baling or recycling. In conjunction with landfilling, the primary purpose of shredding is three-fold: 1) it produces a uniform material that will compact more easily with less possibility of future settlement; 2) it reduces volume and thus reduces transportation costs when large distances to disposal sites are involved; and 3) it reduces operational problems by minimizing rodents, flies, blowing litter and uncontrolled fires.

Currently, there are several locations in the nation where shred-landfill operations are in existence. A review of these existing systems by local and state officials as well as by the Consultant have indicated several negative concerns. Basically, it has been determined that the shred-landfill operation is not economical due to high capital and operational costs. Based on the investigations conducted to date, it is the Consultant's feeling that the advantages of increased operational efficiencies with shred-landfill operations do not outweigh the high capital and operational costs of a shredding plant located in the study area.

b. Baling

The primary purpose of baling solid waste is to reduce the waste's volume. The reduction in waste volume affords several advantages in the management of solid wastes. In regard to transportation, baling can significantly reduce the number of trips and, correspondingly, the cost if large waste quantities and long distances are involved. In regard to operation of sanitary landfills, baling also offers several advantages. These include: 1) elimination of loose, blowing paper and rubbish; 2) better control of flies and rodents; 3) elimination of expensive landfill compaction equipment; and 4) a decrease in operation and capital costs due to less cover material and less land required because of the higher densities involved.

Several types of balers are utilized today throughout the nation. Some balers compress the waste to densities in excess of 1,500 pounds per cubic yard, and do not require any type of binder. Other types of balers compact wastes to lower densities, necessitating wire or twine ties. In the majority of instances, baling facilities require an enclosed building for waste dumping, conveying, and processing.

Based on the Consultant's research and experience, it was determined that the operational advantages obtained from baling do not justify the high costs incurred in owning and operating the equipment. In most instances, a modular-size baling facility which would accommodate the wastes generated in the county would range in cost from $500,000 to over $1,000,000, depending upon the design improvements deemed necessary. In addition to the facility's capital cost, operational costs and a sanitary landfill cost must also be added. It can be assumed that these costs would be substantially higher for the study area than the cost of operating a conventional landfill.

3. Incineration with Heat Recovery

Because of the increasing costs of fuel in the nation, alternative fuel sources are currently being developed and evaluated. Solid waste is receiving increasing consideration in this regard because it is available in substantial quantities and can be prepared for use as a fuel. One of the primary considerations in utilizing solid waste as an energy source is to locate or develop energy markets which fit other problem constraints. Basically, those con-

straints are: 1) the market must have an adequate fuel demand to make it economically worthwhile to install the necessary receiving and firing equipment; and 2) the market must have an agreeable attitude toward the utilization and pricing of a new energy source.

Through modern technology the utilization of solid waste as an energy source can be accomplished by three basic methods: 1) the use of solid waste as a primary fuel source to generate steam; 2) the use of processed solid waste as a supplement fuel in combination with other fossil fuels; and 3) the use of gases derived from pyroloyzing solid waste. After a thorough review of the waste incineration and heat recovery systems in operation throughout the nation, it was determined that a modular incineration facility would be most applicable for the study area. These types of systems do not require a high degree of initial waste processing, nor do they require large quantities of waste to be economically feasible. These systems are normally supplied in modules with current installations ranging in capacity from 10 to 250 tons per day.

As previously indicated, there are approximately 4,100 tons of waste generated annually in the study area. Based on an average heating value of 5,000 Btu's per pound for solid waste, it is estimated that the 4,100 tons of waste could replace approximately 41 million cubic feet of natural gas annually. In regard to the generation of steam, it is estimated that the energy available from the same waste quantity could generate approximately 16 million pounds of steam annually, based on a generation of 125 psi steam at a 40 percent efficiency. The same energy could produce approximately one million kwh of electricity.

Based on a market search for potential energy users with energy consumption similar to those identified above, it was determined that no favorable market conditions exist within or adjacent to the study area. Because a favorable market must be located in order to justify this heat recovery alternative, this alternative was not evaluated past this initial stage.

4. Transfer Station

In certain circumstances it may be more feasible for a municipality or population center to transport is waste to a larger community than to operate its own sanitary landfill. For this option to be feasible, transportation costs must be reduced to a minimum. One method of reducing transportation costs is to utilize a facility where collection vehicles and individual haulers' wastes are deposited and transferred to large-capacity vehicles. These large vehicles in turn would transport waste to a regional disposal site.

For areas where populations exceed 2,500 and transportation distances exceed approximately 40 miles, it is in many instances economical and practical to have the transfer station equipped with a compaction unit. This allows for a substantial increase in the quantity of waste which can be transported each trip. The facility should also include an enclosed tipping area for aesthetic and

maintenance purposes. Currently, there are two transfer stations of this type in Montana; one located in Columbus and one in Forsyth.

Based on the Consultant's experience and the operational history of transfer stations currently in use in the state and nation, it is recommended that these facilities be evaluated in detail when the cost or availability of land for local landfilling operations are prohibitive. The equipment utilized for this type of facility has been utilized for several years and has a well-proven operational record.

5. Container Systems:

For rural areas and small communities where no individual door-to-door collection service is available, one potentially economical solid waste disposal alternative is the use of containers strategically placed throughout the service area. These containers are emptied periodically by use of specially designed vehicles, and the waste is then transported to a central transfer, recycling or disposal facility. In many instances throughout the state and nation, a container system has replaced several smaller indiscriminate dumps, providing an economical waste disposal method which is in compliance with all local, state and federal laws.

Currently, there are three types of container systems that are being utilized throughout the nation. A brief description of each is included herein:

a. "Green Box" System

This system basically consists of locating several small containers from four to ten cubic yards in size throughout a sparsely populated area. These containers are placed in locations that are readily accessible, including intersections of local highways, recreational areas, and in or near small communities. These container systems can be designed such that the waste in the containers can be emptied into either a front-loading, side-loading or a rear-loading waste collection vehicle. Currently, several areas in Montana including the Blackfeet Indian Reservation utilize this type of system for the disposal of wastes in the less populated areas.

b. "Roll-Off" System

This system is quite similar in concept to the "Green Box" system described above, with the exception that fewer, larger containers are utilized. In most instances, 40-cubic-yard containers are utilized in this system, but containers varying in size from 20 to 50 cubic yards also function well under certain circumstances. Because of the large size of the containers, a ramp must be built at the site. A specially designed vehicle with a truck chassis and a tilt-frame bed is used to load, unload and transfer the wastes from the container site to the disposal site. Unlike the "Green Box" system where the container is emptied on-site, this system requires the tilt-frame vehicle to leave an empty container and pick up the full container. Currently, several counties in the state are

utilizing this system, including Big Horn, Broadwater, Carbon, Cascade, Jefferson, Lake, Rosebud, Treasure, and Yellowstone Counties.

c. "Transtor" System

This system is basically similar to the "Roll-Off" system, with the exception that the containers that are utilized to store the wastes are not picked up and transported to the disposal site but instead are permanently mounted at the site. Under this alternative, the containers are approximately 45 cubic yards in size and are designed such that the containers are emptied directly into a large 100- to 120-cubic-yard open top transfer trailer utilizing hydraulically operated equipment. Like the "Roll-Off" system, each "Transtor" container site must include a concrete retaining wall and ramp. Currently there are several of these "Transtor" container sited located in or near small communities in Alberta, Canada. There are, however, no facilities of this type in use in Montana or adjacent states at this time.

D. DESCRIPTION OF APPLICABLE ALTERNATIVES

1. Summary of Technology Assessment & Preliminary Analysis

Based on the assessment of the various waste disposal incineration and transfer concepts conducted for this project and summarized above, it was determined that five disposal concepts warranted additional analysis. These concepts included: 1) use of areawide landfills, 2) use of a "Green Box" system, 3) use of a "Roll-Off" system, 4) use of a "Transtor system, and 5) use of two transfer stations to replace the containers or areawide landfills (depending upon the alternative) at East Glacier and St. Mary. The remainder of the concepts initially identified including intermediate processing and incineration with heat recovery were determined to be not applicable either due to their costs or applicability to the conditions of the study area and thus were not further evaluated.

For each of the five disposal concepts that warranted additional analysis, preliminary schematics, locations and system costs for the necessary facilities and services were developed. This information was then compiled into an interim report for review by the project Technical Committee members. Based on the costs and the general consensus of the members of the project committee, it was determined that the major emphasis of the final analysis should be placed on three alternatives. These include: 1) use of areawide sanitary landfills, 2) use of a "Green Box" container system and 3) use of a "Roll-Off" container system. Based on this input, the remainder of the information contained in this chapter discusses in detail a description of the facilities, services and costs for each of these three alternatives. It should be noted that system layouts and costs of the remaining two alternatives that were preliminarily evaluated ("Transtor" container system and transfer station alternatives) are included in the "Second Interim Report" and are on file at the office of Robert Peccia and Associates (Helena, Montana).

2. Discussion of Applicable Facilities

For the three waste disposal alternatives identified above to warrant an in-depth analysis, facility layouts and operating criteria were developed. Included herein is a description of the facilities and operating criteria for the various alternatives evaluated for this project. This information was then utilized as the basis for evaluating the annual system costs for each alternative. These specific annual system cost analyses are included in Section C of this chapter.

a. Sanitary Landfill

Through research and practical operating experience for the past two decades, it has been determined that are a variety of methods for operating a sanitary landfill. The two most prominent methods are the trench and area methods. The trench method consists of excavating trenches with a dozer and/or scraper and stockpiling the soil for use as cover material. Solid waste is then placed into the pre-excavated trenches, compacted and covered each operating day with four to six inches of the stockpiled cover soil. This method is primarily used in areas where the terrain is relatively flat. Exhibit 2 depicts a schematic of this type of operation.

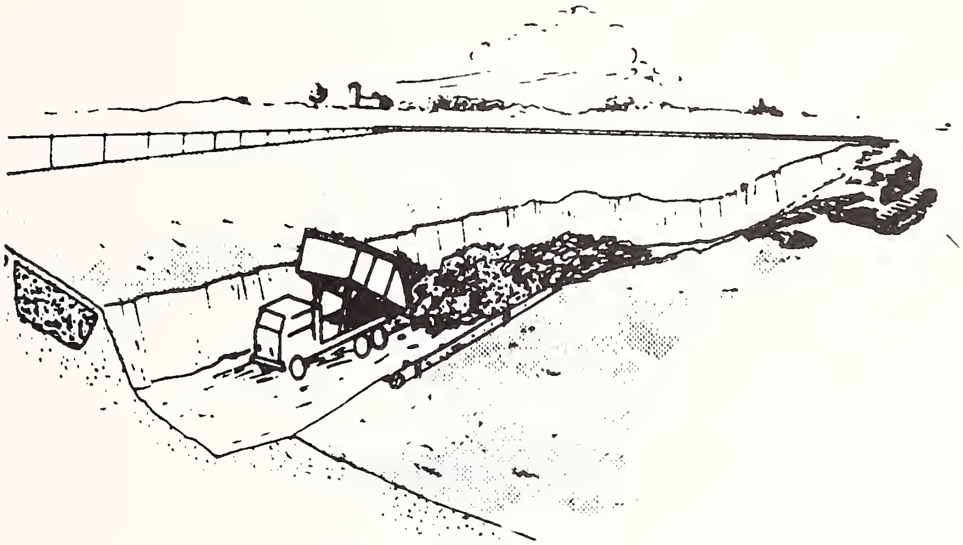
The area landfill method differs from the trench method in that minimal site preparation is required. In this method, individual cells are constructed in various areas throughout the site until the entire site is filled. Each cell represents the waste received from one operating day. Cover material is excavated from the areas adjacent to the working face of the active fill area and is deposited over the previously compacted refuse. Exhibit 3 illustrates this type of landfill method.

b. "Green Box" System

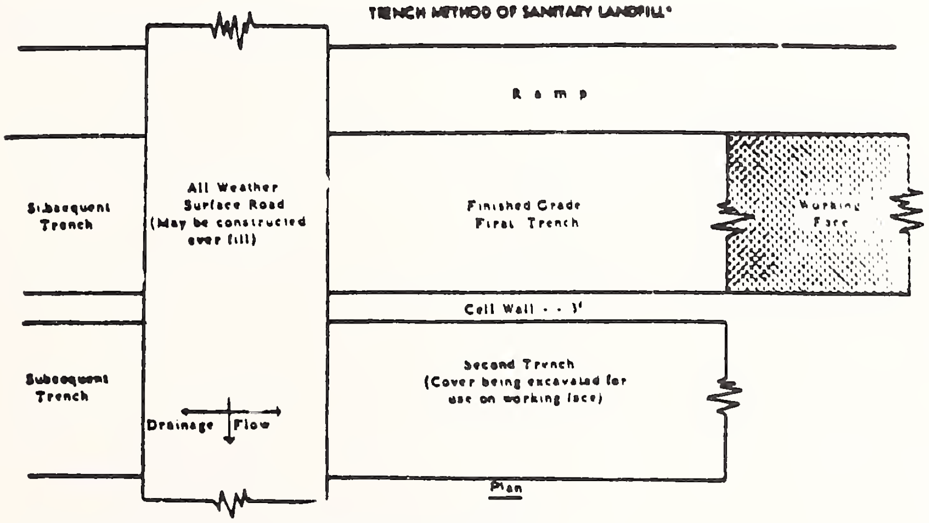
This system includes the use of small containers ("Green Boxes") strategically located throughout the service area and a specially designed packer vehicle to empty the waste from each container as required and to transport the waste to a central disposal site. This basic system is currently being utilized throughout the majority of study area. Under this system, four-cubic-yard containers are located within the boundaries of the Blackfeet Indian Reservation with the containers emptied periodically by use of one of two side-loading packer vehicles. All wastes currently collected under this existing program are transported and disposed of at the landfill located near Browning. For this alternative it was assumed that this current basic system would be utilized and expanded to provide adequate service to the entire study area.

A review of the existing "Green Box" systems in operation in the study area as well as the state indicates that the "Green Box" system is an economical and effective method for disposing of waste and reducing indiscriminate dumping. The biggest drawback to the system is the limitation on the types and sizes of materials that can be deposited due to the

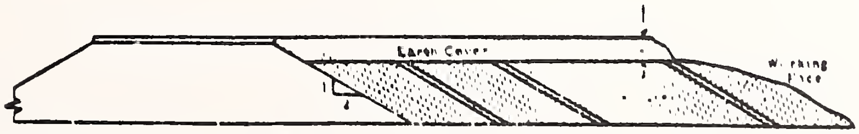
Sanitary Landfill-Trench Method



TYPICAL ILLUSTRATION


TRENCH METHOD OF SANITARY LANDFILL*
Ramp
Subsequent Trench
All Weather Surface Road (May be constructed over fill)
Finished Grade First Trench
Working Face
Cell Wall - - 3'
Subsequent Trench
Second Trench (Cover being excavated for use on working face)
Drainage Flow
Plan

TYPICAL PLAN VIEW

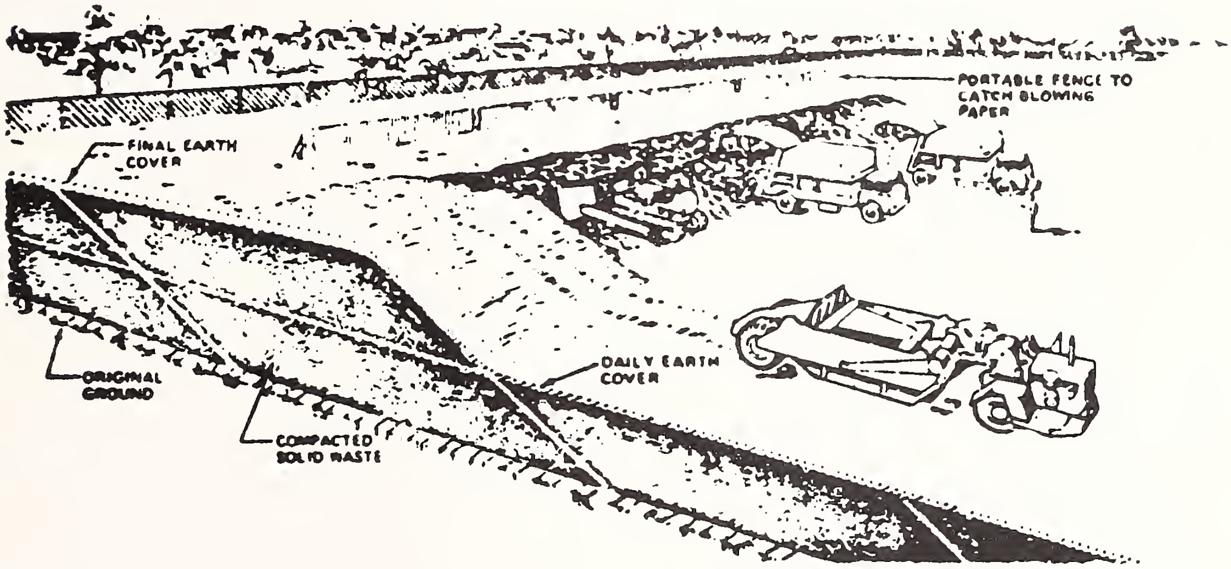


TYPICAL ELEVATION VIEW

Source: State of Montana Solid Waste
Management and Resource
Recovery Study, August, 1976

Exhibit 2

Sanitary Landfill-Area Method



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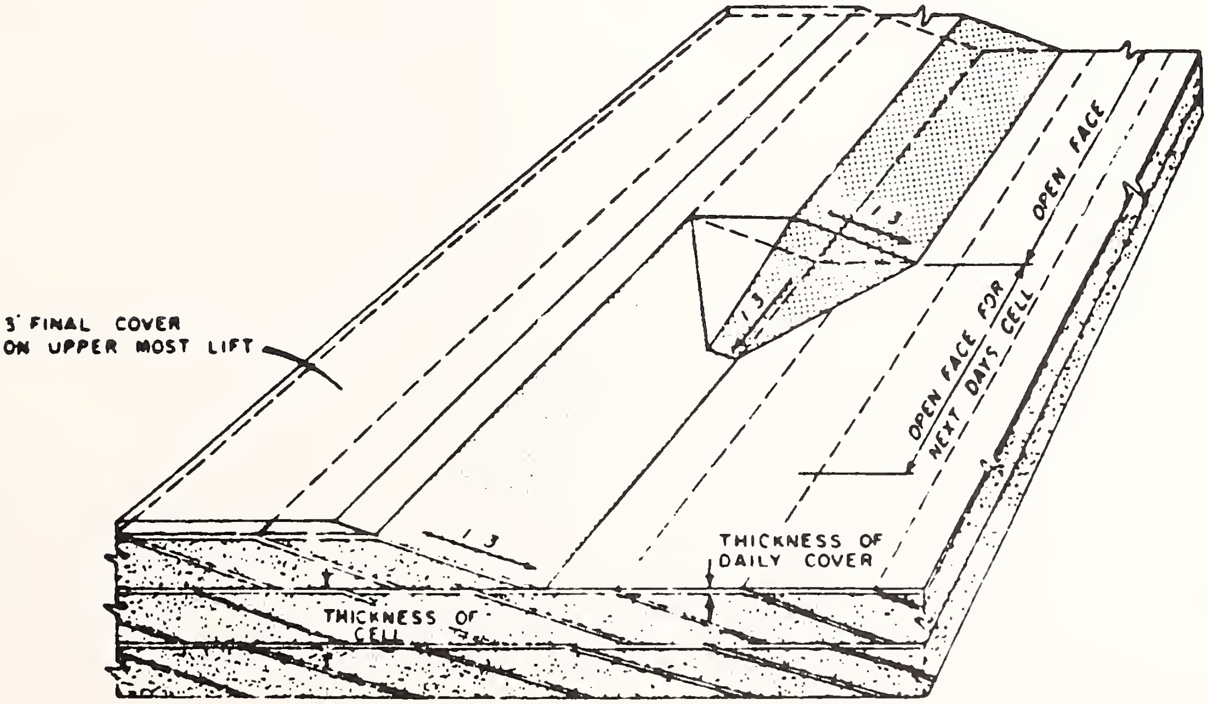

3' FINAL COVER ON UPPER MOST LIFT
1 3
1 3
1 3
OPEN FACE
OPEN FACE FOR NEXT DAYS CELL
THICKNESS OF DAILY COVER
THICKNESS OF CELL

TYPICAL PLAN VIEW

Source: State of Montana Solid Waste
Management and Resource
Recovery Study, August, 1976

Exhibit 3

small size of the container openings (three feet by four feet) as well as the incompatibility of these types of waste with typical packer trucks. Thus larger items such as demolition debris, tree limbs or appliances must be transported either individually or through the use of an additional waste pickup service (dump truck, flatbed, etc.) to a disposal site. In some instances this can be an extreme inconvenience to area residents if proper facilities or services are not provided affording the possibility of indiscriminate dumping of these items. The major advantage of the system is the high level of service available to the population served. In most cases, the system provides a disposal site located within a few miles of their residence. The system also provides a 24-hour, seven-day-per-week service since the container sites are not required to be monitored.

c. "Roll-Off" System

This system includes the use of large, non-compacted roll-off containers strategically located throughout the service area and a tilt-frame vehicle specifically designed to load, transfer and unload the containers. This system is basically similar in practice to the "Green Box" system with the exception that fewer and larger containers are used. Because of the large size of the containers, certain site improvements must be made at the location of each container. These improvements include a shelter over the dumping area, a retaining wall, ramp and a concrete pad for loading and unloading the containers. A layout of a typical roll-off site is depicted in Exhibit 4.

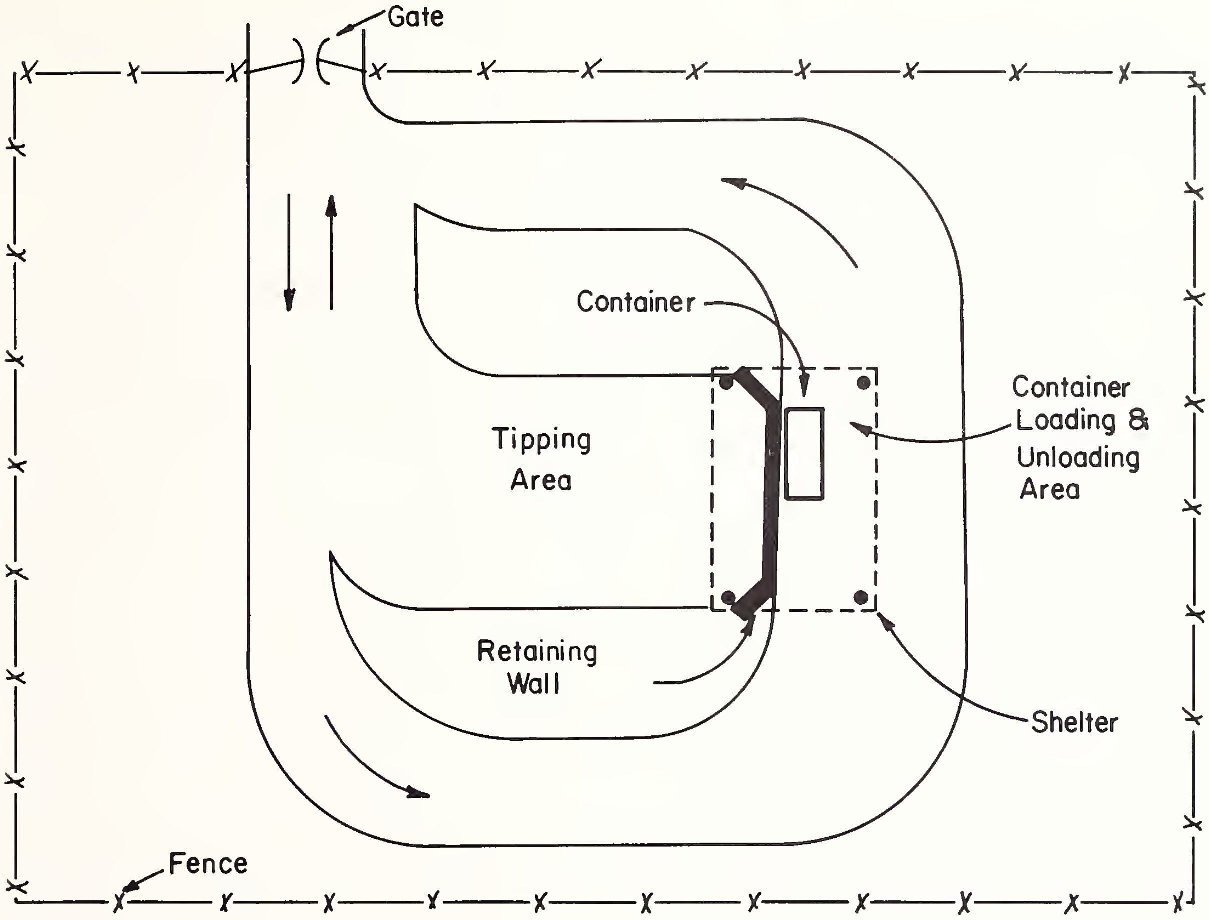
A review of existing roll-off systems located throughout the state and nation indicates a wide acceptance and increasing interest in the system. The major advantage of the "Roll-off" system over the "Green Box" system is the flexibility and essentially limitless types of wastes which the system can handle. Because of the large size of the containers, large bulky materials such as appliances, tires, demolition debris and wood wastes can be deposited. Thus the need for additional landfill sites or pickup services to dispose of these waste types is not necessary. In a rural agricultural area such as the study area, this is an important consideration. The major disadvantage of this type of system compared to the "Green Box" system is the proximity of the total service area to a disposal site. Under the "Roll-Off" system concept, the normal policy is to locate container sites at or near current or old dump sites with the possible addition of one or two sites, depending upon the population distribution in the area. This system requires a certain percentage of the population to travel a few additional miles to a deposit site when compared to a "Green Box" system, in which many more drop sites are available.

C. ANNUAL SYSTEM COST ANALYSIS

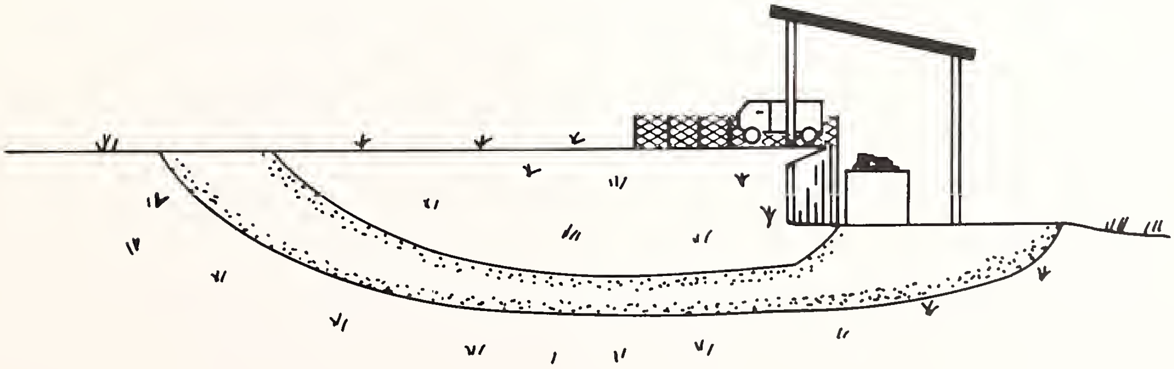
1. General

The primary purpose of this section of the report is to evaluate and compare the annual system cost for each of the specific solid waste handling

"Roll-Off" Container Site



Site Layout



Site Profile View

Exhibit 4

alternatives that were determined applicable for the study area. As previously indicated in this chapter, there are three basic waste handling alternatives that will be discussed herein. These include: 1) use of area-wide landfills, 2) use of a "Green Box" container system, and 3) use of a "Roll-Off" container system.

For the three basic alternatives that were identified as being applicable and thus warranting an in-depth analysis, specific disposal options were initially identified. Detailed studies and subsequent annual costs were then calculated for each alternative. Finally, the various cost components were individually added to determine each alternatives total system cost. These system costs were then compared with one another so that the project Technical Committee members could form general conclusions and make subsequent recommendations as to the most economical and practical waste disposal alternative for the study area.

2. Design Criteria

a. Waste Generation and Seasonal Variation

In order to effectively evaluate each solid waste disposal alternative for this study, the volumes of solid waste generated must be determined for three basic criteria: 1) source of waste generation, 2) seasonal variation of waste generation, and 3) geographic concentration of waste generation. Included herein is summary of these criteria determined applicable for the study area. A detailed analysis of the waste quantity investigations that were utilized to derive this criteria is included in Part Three of this report.

Included in Table 3 is a summary of the annual quantities of waste generated by each major waste generation source. As indicated in the table, approximately 3,560 tons of waste are generated annually as a direct result of the permanent population residing within the study area. As also depicted in the table, an additional 533 tons of waste are generated annually as a direct result of the tourist activity in the immediate study area. Based on this analysis, it is apparent that approximately 13 percent of the total waste generated in the area is tourist-related, whereas the majority of the area's waste (87 percent) results from the permanent population.

In addition to the generation source data, Table 3 also depicts the seasonal variation of the waste generation for each geographic area of the study area. The locations of the geographic areas delineated in the table are depicted in Figure 6. As depicted in the table, the waste generation varies appreciably from summer to winter with the quantities of waste varying from 113 tons per week to 67 tons per week for the respective seasons. As also depicted in the table, the majority of the seasonal fluctuation in waste generation occurs in the western portion of the study

TABLE 3

ALTERNATIVE ANALYSIS
DESIGN CRITERIA FOR WASTE QUANTITIES

I. GENERATION SOURCE:

	Source	Tons/Year
1.	Permanent	3,560
2.	Seasonal	
	a) Glacier National Park	165
	b) Concessionaire	175
	c) Tribal Campgrounds	23
	d) Non-Tribal Campgrounds	57
	e) Motels	78
	f) Border Ports	5
	g) Department of Highways	30
	Subtotal:	533
Total:		4,093

II. SEASONAL VARIATION BY GEOGRAPHIC AREA:

Area	Average Annual Waste Generation Tons/ Yr.	Tons/Wk.	Generation During Tourist Season Tons/Wk.	Generation During Non-Tourist Season Tons/Wk.
Northwest	759	15	38	8
Southwest	2,076	40	50	37
Northeast	576	11	12	11
Southeast	682	13	13	13
Total:	4,093	79	113	69

area, which can be attributed primarily to Glacier National Park and private concessionaire facilities associated with the Park.

b. Areas Requiring Special Provisions for Bears

Through the preliminary stages of this study it became apparent that for those regions of the study area which bears are known to frequent, special precautions should be taken to prohibit or discourage bears from entering or disturbing the solid waste storage or disposal facilities. The areas in which these special precautions should be taken are depicted on Figure 6. As indicated on the figure, the general location of the required "bear proofed" waste facilities is the western one-fourth of the study area which basically includes that portion of Glacier National Park in the study area and the area in Glacier County immediately east of the Park.

After evaluating several methods that have been utilized throughout the nation to deter bears from frequenting or destroying solid waste handling facilities, it was determined that the following special "bear proof" provisions would be the most appropriate for the various solid waste alternatives that were evaluated herein:

(1) Sanitary Landfill

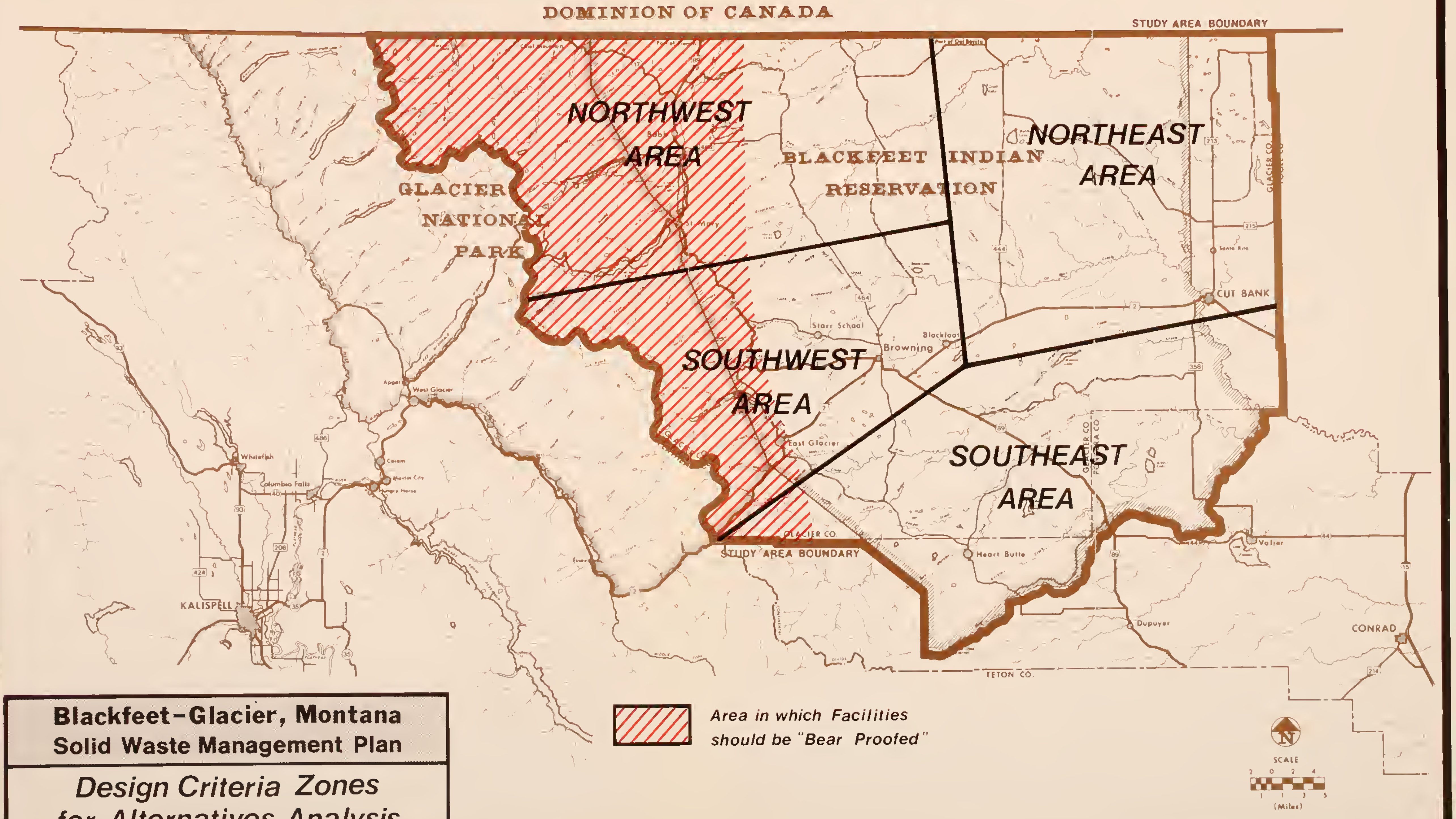
For the alternative in which landfills would be located in the areas frequented by bears, a special electrified fence would be installed around the site. (This improvement has seemed to detract the bears quite effectively in the West Yellowstone area). This fence would basically include a 12-foot chain link fence with the initial four feet buried in the ground and the remaining eight feet located above ground. The fence would be provided with low voltage electricity. During the spring, summer and fall months, the electricity would be turned on to deter the bears. In the winter months, the electricity would not be necessary. A lockable gate constructed of similar materials would also be provided. This gate would only be open during the specific hours that each landfill site was open.

(2) "Green Box" System

For this alternative it was determined that a special "mail box" type lid should be installed on all containers in those areas where bears may frequent. (These lids are similar in principle to those utilized on the containers located in Glacier National Park.)

(3) "Roll-Off" System

For this alternative it was determined that an electrified chain link fence should be constructed around each "Roll-Off" container site in the areas which bears may frequent. This fence would be constructed and operated similarly to that discussed for the landfill option. For these facilities, it is anticipated that maintenance personnel would open and close the gate to each container site each morning and evening during the spring, summer and fall months



Blackfeet–Glacier, Montana
Solid Waste Management Plan

Design Criteria Zones
for Alternatives Analysis

Robert Peccia & Associates / Fred C. Hart Associates

▨ *Area in which Facilities should be "Bear Proofed"*

Figure 6

whereas the container site would be kept open 24 hours per day, seven days per week during the winter months. It is anticipated that this duty could be performed by a resident(s) living near each container site, and thus little or no labor would be required.

Through discussions with members of the project Technical Committee throughout the development of this study, the point has been brought out that although an electrified fence or a special container lid may prohibit bears from entering the waste dumping area, these provisions may not deter the bears' attraction to the general waste disposal area. With this in mind, the alternative of utilizing buildings to house "Green Box" and "Roll-Off" containers was explored. (Obviously, this option is not practical for the landfill alternative). Through discussions with federal officials and consultants with experience in this subject, it was basically concluded that locating container sites inside buildings does deter bears to a greater degree than simply utilizing electrified fences; however, it is not an "iron clad" solution to the bear attraction problem. Two major drawbacks to utilizing this alternative that were brought up in discussions with those officials with experience in this subject include: 1) the extremely high capital and maintenance cost of such facilities; and 2) the inability to educate the general public on closing doors at sites that are not attended by personnel employed by the disposal program. (In most cases it would be cost-prohibitive to hire full-time gate keepers at each container site).

Based on the information and research compiled for this study, it is the general consensus of most individuals familiar with this "bear proofing" subject that if proper facilities are constructed to prohibit bears from entering the actual waste area, the bears will frequent the waste disposal area less over a period of time to the point that over a several-year period the bear frequenting problem will be quite minimal. It is also the general consensus that during the initial few months or in some instances over the initial few years in which a new disposal program is initiated whereby bears are deterred from gaining access to a waste disposal site, bear destruction problems may actually increase compared to the existing conditions. This is true in many cases until the bears become accustomed to the new program and locate new sources of food, etc.

Based on the research conducted and the conclusions summarized herein, it is this Consultant's recommendation that electrified chain link fences would be the most cost-effective method for "bear proofing" the landfill and roll-off container sites. Due to the numerous sites that would have to be fenced under the "Green Box" alternative, it was determined most cost effective to utilize the "mailbox" lid option to "bear proof" the containers utilized for the "Green Box" alternative rather than to fence off each container site. Based on these conclusions, the costs developed in the following section of this chapter incorporate these recommended "bear proofing" concepts and improvements.

3. System Cost Components

For each specific solid waste option that was evaluated, it was determined that three basic cost components were applicable. These cost components include: 1) the individual facility capital and annual costs; 2) the disposal costs associated with operating the necessary disposal sites; and 3) the transportation cost associated with hauling the wastes from the various waste handling facilities to the final disposal site(s). Included herein is a brief discussion of each.

a. Waste Handling and Final Disposal Facility Costs

The costs associated with the construction and operation of the various waste handling facilities as well as the final disposal sites for each alternative were calculated in detail. For each specific alternative that was evaluated, the waste handling and disposal costs are depicted herein.

b. Transportation Costs

When evaluating the transportation costs of solid waste disposal systems, there are two types of haul that warrant consideration. These are: 1) primary haul, which represents the cost of transporting waste directly from the point of generation to either a rural container site, transfer station, or ultimate disposal facility; and 2) secondary haul, which represents the cost of transporting waste from one facility to another.

In most instances the primary hauling of solid waste is associated with the use of vehicles which initially collect or transport the waste. For wastes generated in larger communities, a packer-type collection vehicle is most generally used. For wastes generated in rural areas, the primary haul is usually associated with individuals transporting their wastes to either a disposal site or container site utilizing their own vehicles. When analyzing the secondary hauling of wastes, vehicles specifically designed to transport large quantities over long distances are utilized. These vehicles usually include flatbeds, large transfer trailers, or compaction trucks.

It is the intent of the scope of services for this project to specifically determine and include in the system cost analysis only the secondary haul costs associated with each alternative evaluated. The reasoning behind not including specific primary haul costs in the system cost analysis is two-fold: 1) the intent of the project is to determine the most cost-effective method for disposing of the wastes generated in the study area, which excludes door-to-door collection and individual transportation of wastes from each home or business to a central disposal site; and 2) it would be impossible to estimate the cost for each individual within the study area to transport his or her own wastes to the various disposal sites which were evaluated.

In regard to estimating the secondary haul costs associated with each alternative that was evaluated for the area, unit haul costs were developed for three vehicle types. The sources of information used to derive the unit costs were: 1) equipment manufacturers and suppliers; 2) operating records from city, county and private firms presently operating solid waste collection, transportation and/or disposal services; and 3) an analysis of present labor rates and fuel prices throughout the area.

Table 4 summarizes the unit costs for the vehicles that were deemed necessary to transport the wastes for all solid waste transfer and disposal systems determined applicable and warranting an in-depth analysis. In all cases, labor costs are not included. Labor costs are, however, included as a separate item in the total system cost analysis. (A labor rate of $10.00 per hour was utilized for this analysis). It should be noted that the costs depicted in this table represent costs as of August, 1981 with no inflationary factors added. It was also assumed that the vehicles would be owned and operated by a non-taxable entity. Thus, no overhead, taxes and profit are added to these vehicle costs. According to private firms contacted by the Consultant, however, these costs appear to be reasonable if the services were to be contracted to a private firm.

4. System Cost Analysis Summary

Included herein is a summary of the annual system cost analyses that were conducted for the specific disposal alternatives determined potentially applicable for the study area. The total annual system cost for each alternative is summarized in Table 5. The specific discussion and itemized costs for each alternative are included in the following narrative, tables and figures.

a. Areawide Sanitary Landfills

For this study it was attempted to estimate the cost to operate landfills located throughout the study area for the two extreme levels of service deemed practical for the study area: 1) nine landfill sites strategically located throughout the study area; and 2) five landfill sites strategically located throughout the study area. The anticipated approximate locations of the various landfills for these two options are depicted on Figure 7.

For each of these landfill options, it was assumed that the landfill located near Browning would be open five days per week during the summer months and three days per week during the remainder of the year. For these options it was also assumed that the residents living in the extreme eastern portion of the study area would utilize the present City of Cut Bank landfill, where a drop charge of $10.00 per ton would be assessed for use of the site. For the remaining landfill sites (satellite landfills) located in the study area, it was assumed that the sites would be open two days to six days per week, depending upon the season and location of the site.

TABLE 4

TRANSPORTATION UNIT COSTS

I. DEPRECIATION

	Vehicle Type	New Price	Less Salvage Value[1]	Estimated Mileage	Cost Per Mile
1.	20 c.y. Packer	$ 55,000	8,250	175,000	0.27
2.	Dump Truck	30,000	4,500	175,000	0.15
3.	Tilt-Frame	65,000	9,750	175,000	0.32
4.	Dozer Transport	65,000	9,750	300,000	0.18

[1] Represents 15% of capital cost

II. OPERATION & MAINTENANCE (Cost Per Mile)

	Vehicle Type	Fuel[1]	Oil & Lube	Other	Total Cost
1.	20 c.y. Packer	$0.37	$0.07	$0.40	$0.84
2.	Dump Truck	0.26	0.05	0.35	0.66
3.	Tilt-Frame	0.26	0.05	0.37	0.68
4.	Dozer Transport	0.52	0.08	0.50	1.10

[1] Based on $1.30 per gallon (diesel)

III. TOTAL COST (Per Mile)

	Vehicle Type	Insurance	Depreciation	Op. & Maint.	Total Cost
1.	20 c.y. Packer	$0.08	$0.27	$0.84	$1.19
2.	Dump Truck	0.05	0.15	0.66	0.86
3.	Tilt-Frame	0.07	0.32	0.68	1.07
4.	Dozer Transport	0.10	0.18	1.10	1.38

In order to develop estimated costs to locate and operate various landfill sites for this alternative, certain basic assumptions were made. For this study, it was assumed that the State of Montana laws and regulations as administered by the State Department of Health & Environmental Science Division would be adhered to. (Although these state regulations cannot be legally enforced on tribally owned land, it was assumed that they would be followed since all other entities including the incorporated communities and Glacier and Pondera Counties would be required to operate facilities under this regulation). The most prominent rules that have been adopted by the State of Montana's regulations include: 1) no open burning shall be permitted at any disposal site without a burning permit; 2) a minimum of six inches of soil shall be placed on all waste the same day as deposited; 3) no wastes shall be placed within ten feet of the high groundwater level or a stream; and 4) access shall be limited at each landfill site to the number of days deemed necessary to adequately serve the facility users. Based on these rules, the following location and operational criteria were developed and utilized to estimate the annual costs for this landfill alternative: 1) the trench landfill method would be utilized; 2) a gate attendant would be on-site during operating hours to supervise dumping and provide general maintenance; 3) a track-type dozer would be transported to each satellite landfill from Browning each day the sites were open to provide daily maintenance and soil cover; 4) the excavation of trenches and/or cover material and road maintenance would be contracted as required; and 5) no current facilities exist and thus all site improvements required to start a landfill site would be needed.

The estimated capital and annual costs to locate and operate a satellite landfill site are itemized in Table 6. As depicted in the table, the costs vary depending upon whether "bear-proof" provisions would or would not be necessary. As shown, the initial capital expenditure required to locate each satellite landfill will vary from $32,600 to $62,500. The total annual cost to amortize the capital expenditure as well as to operate each site according to the State of Montana regulations is estimated to vary from $17,040 to $26,620.

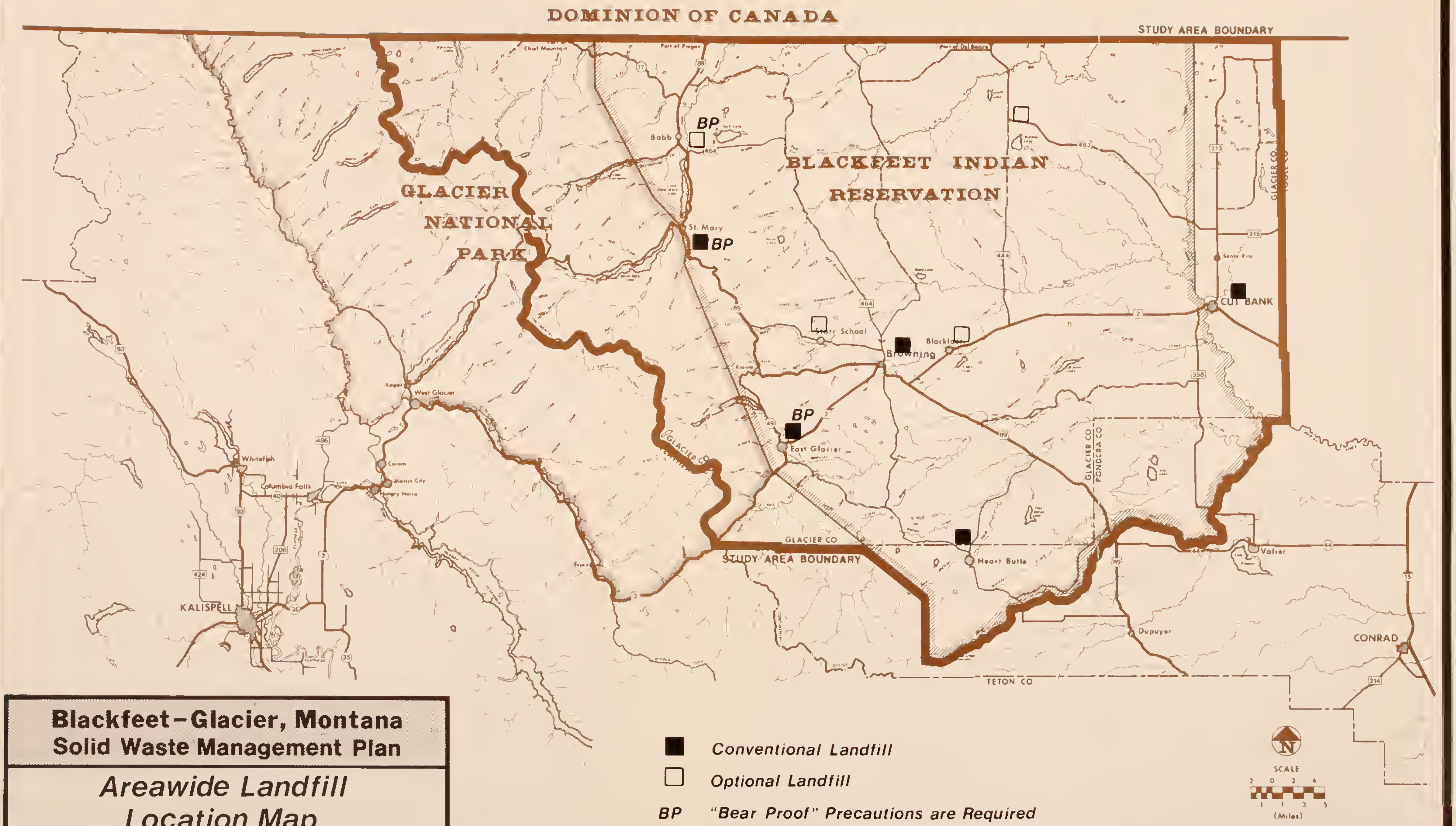
Since the landfill located near Browning would handle substantially more wastes than the satellite landfill under these landfill alternative options, specific costs have been estimated for the Browning landfill. The estimated capital and annual cost to operate the landfill located near Browning are depicted in Table 7. It should be noted that initial site acquisition, development and fencing costs have been included in these costs. Although many of these initial costs have already been expended at the existing site, it is necessary to include all facility costs for all alternatives in order that a true annual cost comparison can be made between the various landfill and container alternatives being evaluated herein. It should also be noted that unlike the satellite landfills for which the dozer would be transported to the site each day, it was assumed that

TABLE 5

ALTERNATIVES ANALYSIS SUMMARY
ANNUAL COST

Cost Element Description	Use of Areawide Landfills 9 Sites	Use of Areawide Landfills 5 Sites	"Green Box" System	"Roll-Off"[1] System	Combination "Green Box" & "Roll-Off" Systems
1. Conventional Landfill:					
a) Site Costs	$202,380	$124,640	$51,360	$51,360	$51,360
b) Trench Excavation	24,660	24,660	17,050	17,610	18,770
c) Cut Bank Drop Charge	5,700	5,700	6,820	5,700	3,400
Subtotal:	$232,740	$155,000	$75,230	$74,670	$73,530
2. Transfer Facilities:					
a) Amortization	0	0	$17,170	$21,300	$21,170
b) Operation & Maint.	0	0	4,870	2,100	2,650
Subtotal:	$0.00	$0.00	$22,040	$23,400	$23,820
3. Transportation Costs:					
a) Vehicle Depr., O & M	$50,370	$24,870	$42,120	$20,850	$35,240
b) Labor	8,190	3,620	23,680	9,430	15,870
Subtotal:	$58,560	$28,490	$65,800	$30,280	$51,110
TOTAL ANNUAL COST:	$291,300	$183,490	$163,070	$128,350	$148,460

[1] All costs are based on the National Park Service and the Park Concessionaire continuing the existing practice of transporting their wastes to the Browning landfill. If the National Park Service and the Park Concessionaire were to utilize the "Roll-Off" container sites at East Glacier & St. Mary, the total annual cost would increase by $6,550.



■ *Conventional Landfill*

□ *Optional Landfill*

BP *"Bear Proof" Precautions are Required*

Blackfeet-Glacier, Montana
Solid Waste Management Plan

Areawide Landfill Location Map

Robert Peccia & Associates/Fred C. Hart Associates

Figure 7

a separate dozer would remain at the site full time to handle the day-to-day maintenance and cover requirements.

Based on the criteria and costs discussed above, the total annual cost to locate and operate either five or nine landfill sites throughout the study area was estimated. As depicted in Table 5, the total annual cost to locate and operate five or nine landfill sites would vary respectively from $183,490 to $291,300. These costs basically indicate that the higher degree of service that nine sites would offer compared to locating five sites would increase the total annual cost by $107,810 which represents an annual cost increase of approximately 59 percent. It should be noted, however, that although the annual costs for five areawide landfill alternative appear to be less than for the nine areawide landfill alternative, the added expense and inconvenience incurred by many residents in driving farther to one of the five landfill sites must be taken into consideration before a final decision is made as to the number of landfills that is most appropriate and cost effective.

b. "Green Box" Container System

This alternative includes the use of 130 four-cubic-yard containers strategically located throughout the study area. (It is estimated that approximately one-half of these containers would require specially designed "bear-proof" lids). Under this alternative the wastes deposited in the containers would be emptied periodically and transported to either the Browning or Cut Bank landfills by use of a 20-cubic-yard packer type vehicle.

For this alternative the Consultant designed specific collection routes to most effectively collect and transport the wastes. The locations of the various collection routes and disposal sites that were designed for this system are depicted in Figure 8. For this alternative, it was attempted to design the collection routes and locate the containers such that 90 percent of the study area residents would live within a five mile radius of a container. Based on this design, it was determined to be most cost effective to empty all containers twice per week with the exception of Routes A and B, where it was determined to be necessary to empty the containers approximately five times per week during the summer months due to the high volume of waste generated in these areas as a result of the tourism activities. Under this alternative it was also assumed that Collection Routes A and B would originate and end at Browning with the wastes collected from these routes ultimately disposed of at the Browning landfill. For Routes C and D, it was assumed that the packer vehicle would originate at Browning and proceed along Route C with the wastes collected along this route disposed of at the Cut Bank landfill. (A drop charge fee of $10.00 per ton would be assessed by the City for use of their city landfill). After disposing of the wastes at the Cut Bank landfill, it was assumed that the packer vehicle would collect the wastes along Route D and dispose of these wastes at the Browning landfill.

TABLE 6

SATELLITE LANDFILL COST SUMMARY
(Less Than 1,000 Tons per Year)

Capital Cost

Item	Units	Unit Cost	Total Cost	
			Conventional	"Bear-Proofed"
Land	4 ac.	$800	$ 3,200	$ 3,200
Roads	400 ft.	$15	6,000	6,000
Building	1,000 sq. ft.	$15	15,000	15,000
Misc. Utilities	Lump Sum (LS)	$2,000	2,000	2,000
Fencing	1,700 ft.	$2 - $18	3,400	30,600
Contingency	L.S.	10%	3,000	5,700
Total Capital Cost			$32,600	$62,500
Amortization (12% - 20 yrs.)			$4,400	$8,400

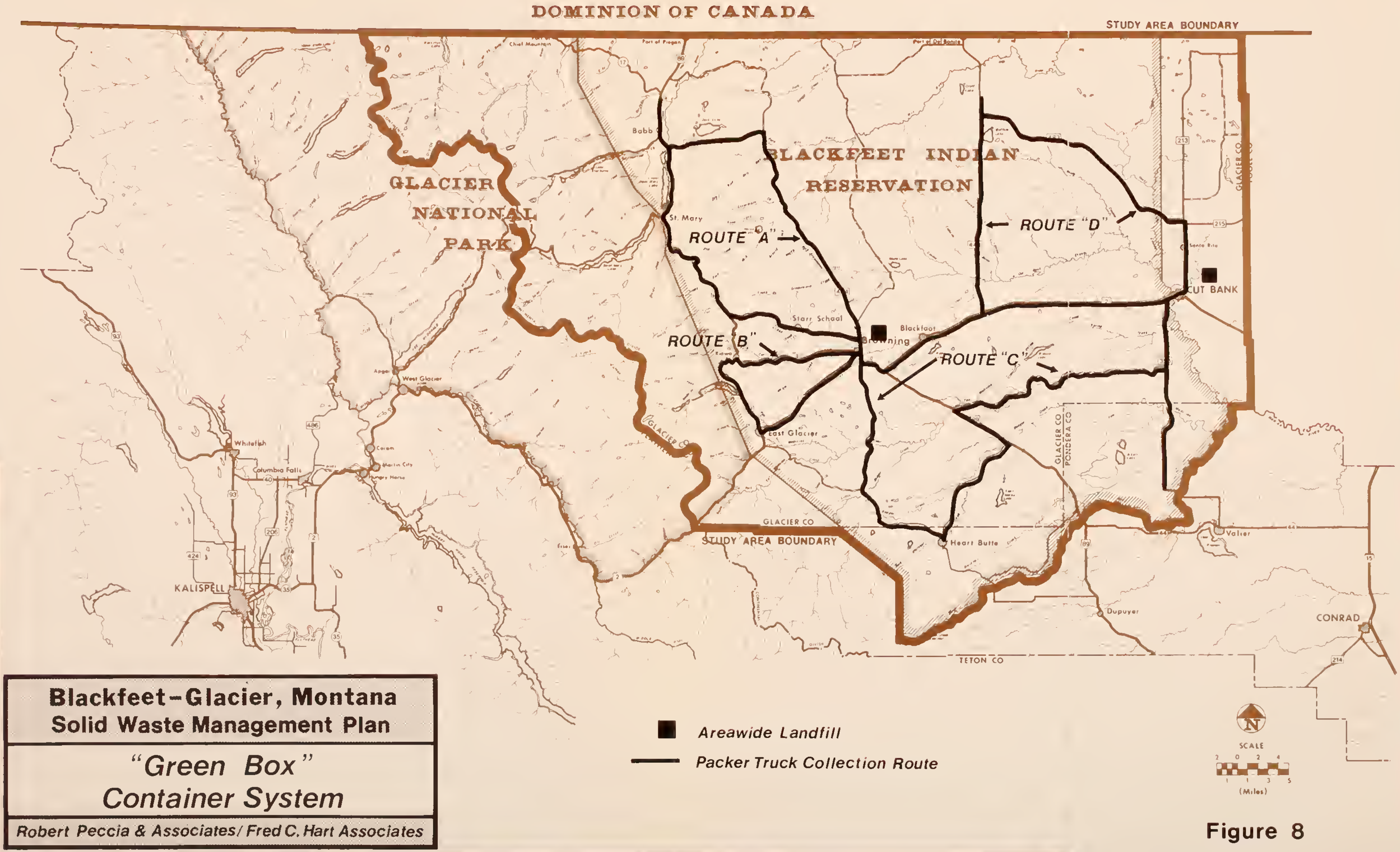
Annual Operating Cost

Item	Units		Unit Cost	Total Cost	
	Conv.	"Bear-Proofed"		Conv.	"Bear-Proofed"
Site & Road Maint.	L.S.	L.S.	$500	$ 500	$ 500
Dozer Depr., Oper., & Maint.	208[1]	304[2]	45	9,360	13,680
Labor	208[1]	304[2]	10	2,080	3,040
Utilities	L.S.	L.S.	400	200	500
Insurance	L.S.	L.S.	500	500	500
Subtotal:				$12,640	$18,220
Amortization of Capital				4,400	8,400
Total Annual Cost:				$17,040	$26,620

[1] Based on two hours per day the site is open (2 days per week all year)

[2] Based on two hours per each day the site is open (2 days per week for 40 weeks, 6 days per week for 12 weeks)

NOTE: Trench excavation costs are not included.



Blackfeet-Glacier, Montana
Solid Waste Management Plan

"Green Box"
Container System

Robert Peccia & Associates / Fred C. Hart Associates

Figure 8

In addition to the "Green Box" container system and landfill facilities discussed herein, it was also determined necessary to provide a disposal service for large bulky wastes including used appliances, bed springs and oversized materials that cannot be placed into the four-cubic-yard containers. Two disposal alternatives for this purpose were evaluated during the study: 1) the location of several demolition and debris disposal sites throughout the study area; and 2) the use of a dump truck or flatbed to periodically travel throughout the study area on a pre-arranged schedule to retrieve these type materials and transport them to the Browning or Cut Bank landfill for disposal. After discussing these options with the Technical Committee members, it was determined that the latter alternative would be most appropriate for this purpose. Based on this it was determined that ten retrieval trips per year throughout the study area would be made utilizing a large dump truck and two personnel.

Based on the criteria discussed above, the annual system cost for this "Green Box" alternative was estimated. A summary of these costs is depicted in Table 5. As indicated in the table, the total annual cost for this alternative is estimated to be $163,070. This includes $75,230 for operation of the various disposal facilities, $22,040 for the amortization and annual maintenance of the four-cubic-yard containers (see upper portion of Table 8 for a breakdown of the capital and annual costs of these containers) and $65,800 for the depreciation, operation, maintenance and labor necessary to operate the vehicles utilized for providing both the "Green Box" and bulky materials pickup systems.

c. "Roll-Off" Container System

This alternative includes the replacement of the existing "Green Box" system with six 40-cubic-yard "Roll-Off" containers strategically located throughout the study area. Under this alternative, the wastes deposited in the six containers would be transported to the areawide landfill located near Browning for disposal by use of a tilt-frame vehicle specially designed to handle the "Roll-Off" containers.

The location of the six container sites as well as the areawide landfills that would be utilized under this disposal program are depicted in Figure 9. As indicated on the figure, the residents in the extreme eastern portion of the study area would be required to utilize the Cut Bank landfill since no container site is located in that area. Under this program, the City of Cut Bank would receive compensation ($10 per ton) for the wastes that were deposited at its landfill by county and reservation residents.

For this alternative, the system was designed by the Consultant so that 90 percent of the study area residents would be located within a ten-mile radius of either a 40-cubic-yard container or one of the two landfill sites (Browning or Cut Bank). The system was also designed so that all containers would be emptied at least once each week throughout the year

TABLE 7

BROWNING LANDFILL COST SUMMARY
(Approximately 4,000 Tons per Year)

Capital Cost

Item	Units	Unit Cost	Total Cost
Land	20 ac.	$1,500	$30,000
Roads	1,000 ft.	$15	15,000
Building	1,500 sq. ft.	$15	22,500
Misc. Utilities	L.S.	$3,000	3,000
Fencing	3,000 ft.	$2.50	7,500
Contingency	L.S.	10%	7,800
Total Capital Cost:			$85,800
Amortization (12% - 20 years)			$11,500

Annual Operation Cost
(192 Days Per Year)

Item	Units	Unit Cost	Total Cost
Site & Road Maintenance	L.S.	$1,500	$ 1,500
Dozer Depr., Operation, & Maintenance	576[1]	$45	25,920
Labor:			
a) Operator	576[1]	$10	5,760
b) Gate Attendant	1,536[2]	$5	7,680
Utilities	L.S.	$1,000	1,000
Insurance	L.S.	$1,000	1,000
Subtotal:			$42,860
Amortization of Capital			11,500
Total Annual Cost:			$54,360

[1] Based on three hours per each day the site is open for covering operations.
[2] Based on eight hours per each day the site is open
NOTE: Trench excavation costs are not included.

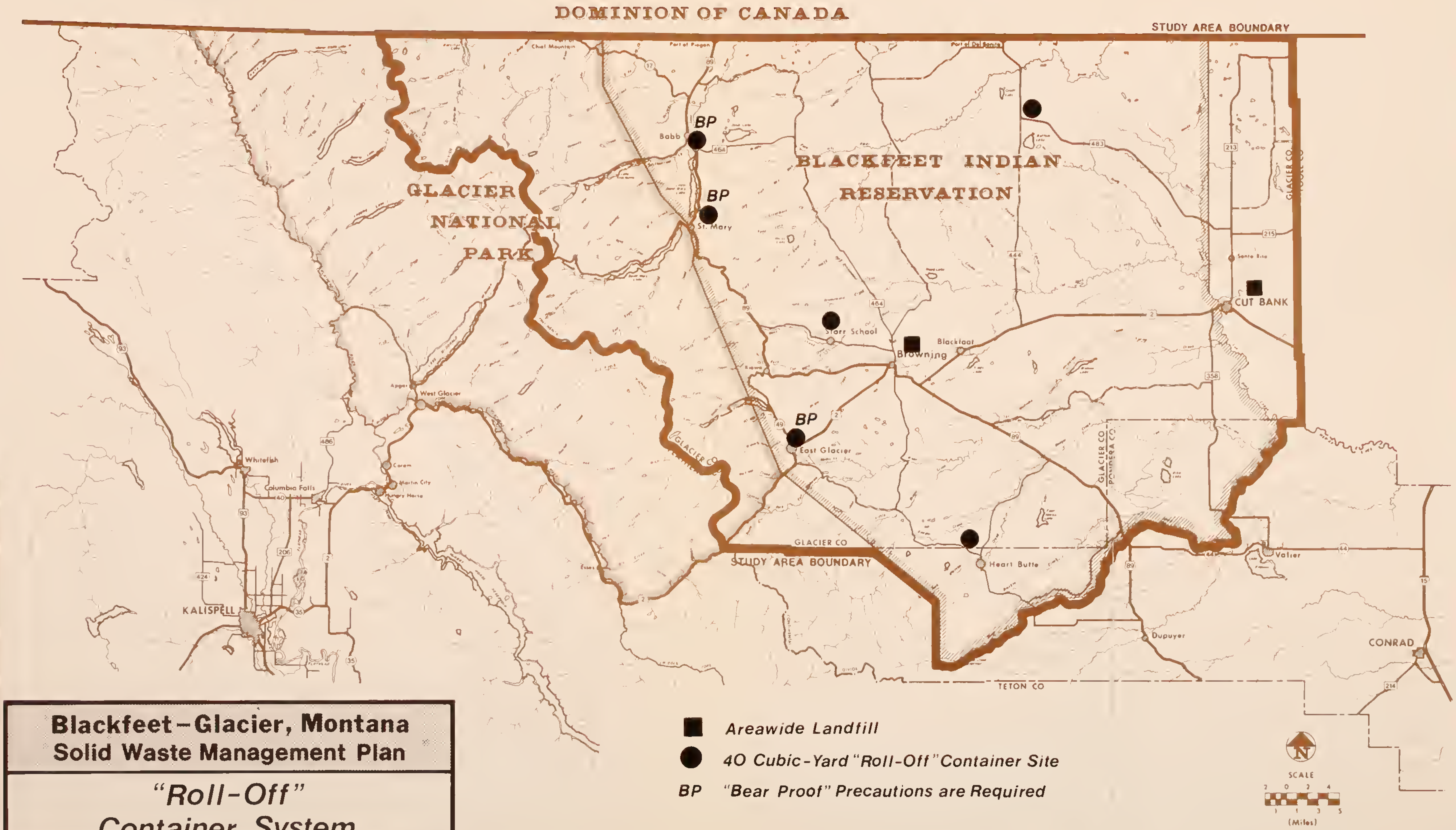
with additional trips made as waste generation warranted. On the average, it was determined necessary to employ an individual for approximately 20 hours per week to operate the tilt-frame vehicle, with the number of hours per week varying from 35 during the summer months to 13 during the winter months. Unlike the "Green Box" system previously discussed, it was not determined necessary to provide a bulky waste pickup service throughout the study area for this alternative since the 40-cubic-yard containers are large enough to handle most types of wastes.

Based on the criteria discussed above, the annual system cost for the "Roll-Off" alternative was estimated. A summary of these costs is depicted in Table 5. As indicated in the table, the total annual cost for this alternative is estimated to be $128,350. This includes $74,670 for the operation of Browning landfill and the proportionate "drop charge" for use of the Cut Bank landfill, $23,400 for the amortization and annual maintenance of the six container sites (see lower portion of Table 8 for a breakdown of costs of these container sites), and $30,280 for the depreciation, operation, maintenance and labor necessary to operate the tilt-frame vehicle.

d. Combination Container System Alternative

This alternative includes a combination of the "Green Box" and "Roll-Off" container systems. Under this alternative, five 40-cubic- yard "Roll-Off" containers would be utilized in the western portion of the study area and 32 four-cubic-yard containers would be utilized in the eastern portion of the study area. The five "Roll-Off" container sites would be serviced as required with a tilt-frame vehicle and the waste would be transported to the areawide landfill located near Browning for disposal. For the 32 four-cubic-yard containers, the wastes deposited in the containers would be emptied and transported to either the Cut Bank landfill or Browning landfill by use of a specially designed packer vehicle. This system was designed by the Consultant so that wastes generated along Collection Route A would be disposed of at the Cut Bank landfill (where a drop charge of $10 per ton would be assessed) and the wastes generated along Collection Route B would be disposed of at the landfill located near Browning. This would permit the packer vehicle that services the "Green Boxes" to collect all wastes generated in the eastern portion of the study area utilizing two round trips per week originating and ending in Browning. The locations of the various facilities that would be required under this alternative are depicted in Figure 10.

Based on the criteria discussed herein, the annual system cost for this combination container alternative was developed. A summary of these costs is depicted in Table 5. As indicated, the total annual cost is estimated to be $148,460. This annual cost includes the amortization, operation and labor costs of all disposal facilities, container sites and vehicles necessary to service the "Green Box" and "Roll-Off" containers included in the program.



Blackfeet–Glacier, Montana
Solid Waste Management Plan

"Roll-Off"
Container System

Robert Peccia & Associates/ Fred C. Hart Associates

Figure 9

TABLE 8

CONTAINER ALTERNATIVES FACILITY COSTS

I. "GREEN BOX" CONTAINER SYSTEM:	Non "Bear-Proofed"	"Bear Proofed"
1. Capital Cost: (per 4 c.y. container)	$500	$1,000
2. Annual Cost:		
a) Amortization (10 years @ 12%)	88	176
b) Maintenance of Container	25	50
Total Annual Cost per Container:	$113	$226

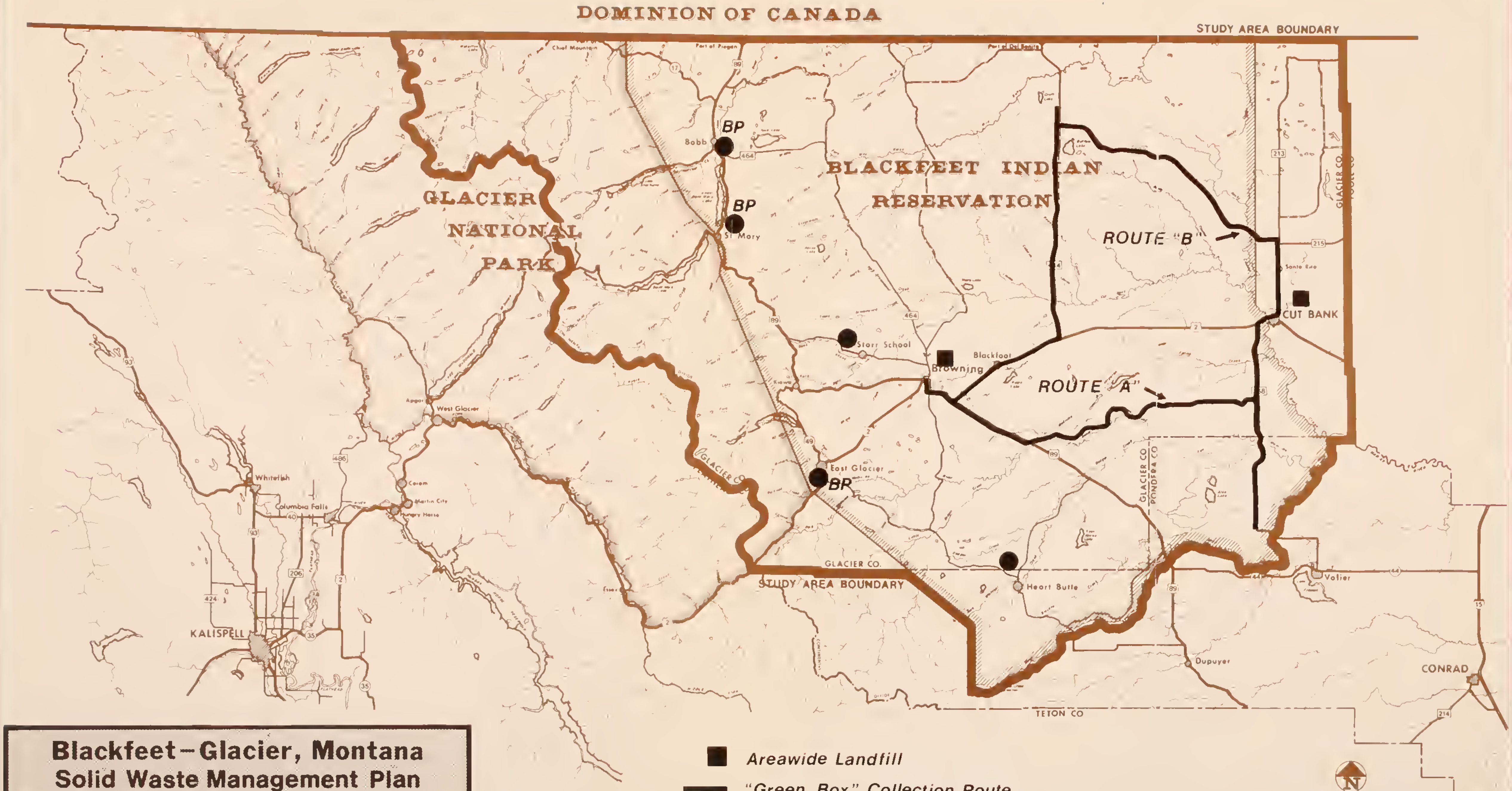
II. ROLL-OFF CONTAINER SYSTEM:

1. Capital Cost:

Item	Non "Bear-Proofed"	"Bear-Proofed"
Land	$1,000	$1,000
Fencing	1,000	10,000
Sitework & Ramp	3,000	3,000
Concrete Slab & Wall	7,000	7,000
Shelter	3,000	3,000
Container (40 c.y.)	5,000	5,000
Contingency	2,000	2,000
Total Capital Cost:	$22,000	$31,000

2. Annual Cost:

a) Amortization (20 years @ 12%)	$2,950	$4,150
b) Maintenance	250	450
Total Annual Cost Per Site	$3,200	$4,600



Blackfeet–Glacier, Montana
Solid Waste Management Plan

Combination Container
System Alternative

Robert Peccia & Associates/ Fred C. Hart Associates

■ *Areawide Landfill*

— *"Green Box" Collection Route*

● *"Roll-Off" Container Site*

BP "Bear Proof" Precautions are Required

Figure 10

e. Summary

As depicted in Table 5 and discussed herein, there is a wide range of costs and levels of service for the alternatives evaluated herein. In addition, the advantages and disadvantages of each system differ, as has been discussed in the previous narrative. Included in Table 9 is a brief summary of the advantages and disadvantages of the four alternatives discussed herein.

As can be noted from the table, it appears that all alternatives have certain advantages and disadvantages that directly relate to the equipment utilized for each system. From comparing the various advantages, disadvantages and levels of service with the estimated annual costs of each alternative, it appears that the container system alternatives are more favorable than the use of several areawide landfills. Furthermore, it appears that there is a trade-off between the "Green Box" and "Roll-Off" systems. The "Green Box" alternative offers a higher number of drop locations compared to the "Roll-Off" system; however, the "Roll-Off" system affords the opportunity to dump large loads of various size materials directly into the containers whereas the "Green Box" system does not. Finally, the annual system costs favor the "Roll-Off" system to a certain degree; however, this difference may be slightly offset by the fact that several rural residents would have to drive longer distances to a "Roll-Off" container site.

TABLE 9

SUMMARY OF ALTERNATIVES

ALTERNATIVE	SUMMARY OF ADVANTAGES AND DISADVANTAGES
1. Use of Areawide Landfills	Advantages: 1. Able to accept all types of wastes 2. Compatible to a certain degree with existing waste disposal practices Disadvantages: 1. Limited access to specific days and hours 2. Limited number of sites 3. High capital & annual costs 4. Operational problems in winter months 5. Difficulty in locating approved sites
2. "Green Box" System	Advantages: 1. Full-time disposal privileges 2. Large number of "drop" sites 3. Compatible with existing waste handling conditions 4. Majority of existing residents are familiar with system 5. System is easy to expand or modify to changes in waste generation characteristics 6. Minimal problems associated with locating container sites Disadvantages: 1. Higher annual costs than other systems evaluated 2. Inability of small containers to handle large bulky wastes

TABLE 9
(continued)

ALTERNATIVE	SUMMARY OF ADVANTAGES AND DISADVANTAGES
2. "Green Box" System (continued)	Disadvantages: 3. Higher annual maintenance & clean up costs of containers than "Roll-Off" system due to increased number of drop sites 4. Inability to dump wastes from large vehicles into containers requiring these vehicles to travel to areawide landfills.
3. "Roll-Off" System	Advantages: 1. Lowest annual cost of alternatives investigated 2. Full-time disposal privileges 3. System easy to expand or modify 4. Able to handle most waste types including bulky materials 5. System affords dumping of wastes from large vehicles directly into containers Disadvantages: 1. Comparatively few drop locations, requiring some area residents to drive long distances to dispose of wastes 2. High capital costs compared to "Green Box" system
4. Combination Container Systems	Advantages: 1. Basically incorporates advantages of "Green Box" & "Roll-Off" alternatives in areas where various facilities are to be utilized

TABLE 9
(continued)

ALTERNATIVE	SUMMARY OF ADVANTAGES AND DISADVANTAGES
4. Combination Container Systems (continued)	Advantages: 2. Provides a high level of service since most residents in study area are within a few miles of a drop location 3. System is compatible to a certain degree with existing waste collection and disposal conditions Disadvantages: 1. High capital costs compared to the "Green Box" system 2. Fewer drop locations in western portion of study area compared to "Green Box" alternative

PART SEVEN

RECOMMENDED SOLID WASTE MANAGEMENT PLAN

PART SEVEN

RECOMMENDED SOLID WASTE MANAGEMENT PLAN

A. GENERAL

For the past several months the alternatives that were evaluated in detail for this study have been reviewed by the project Technical Committee members. After substantial review of the information compiled during the project, a draft management plan report was prepared and distributed in February, 1982, for review by the project Technical Committee members. Based on the subsequent meeting and comments received, a final solid waste management strategy was developed by the project Technical Committee Members. The details of this recommended solid waste management plan are described in this chapter and basically include the following: 1) recommended disposal facilities; 2) organizational strategy; 3) operational strategy; 4) financial strategy; and 5) implementation schedule.

B. RECOMMENDED DISPOSAL FACILITIES

Based on the response obtained from the Technical Committee members who have been involved with this project, a recommended disposal system was delineated involving the continued use of the current "Green Box" container system. Under this plan, the majority of the wastes generated within the study area would be transported to the present landfill site located near Browning. The wastes generated in the extreme southeastern portion of the study area as well as those wastes generated by the residents and businesses in Cut Bank would be disposed of at the current City of Cut Bank landfill. It is assumed that all remaining existing dump sites would be closed under this plan. Since the "Green Box" system cannot handle large, bulky objects such as appliances, bed springs, demolition debris, etc., and since all small, outlying disposal sites will be closed, the recommended plan also includes the implementation of a special bulky material pickup service. This service would include a flatbed or dump truck that would periodically travel throughout the study area picking up these materials and transporting them to the Browning or Cut Bank landfills for disposal.

It is assumed that the municipal collection services in Browning and Cut Bank will continue to be operated and the wastes will continue to be disposed of at the respective landfill sites. It is also assumed that the existing collection and disposal procedures of the National Park Service and the Park Concessionaire will continue; wastes generated at these facilities will be collected and transported to the Browning landfill using their own packer and pickup vehicles.

As a result of several meetings that were held with the project Technical Committee members, it was also determined that the recommended disposal plan may incorporate the implementation of a "Roll-Off" container system to augment the existing "Green Box" system. Implementation of this system would most likely occur in two to three years when the 20-cubic-yard, side-loading vehicles currently used to service the "Green Box" sites will require replacement or major overhaul. It is anticipated that, if the "Roll-Off" system is implemented, 40-cubic-yard container sites would be located near Babb, St. Mary, East Glacier, Heart Butte, Starr School, and Blackfoot. The "Green Box" system would be utilized considerably less, with its major emphasis on serving the eastern portion of the study area. The implementation of this "Roll-Off" system would also greatly reduce the need for the special bulk waste pickup service. The National Park Service and the Park Concessionaire would also benefit, since they would be able to dump the wastes collected by their small packer vehicles directly into the large containers that would be located near East Glacier, Babb, and St. Mary rather than transporting the wastes individually to Browning for disposal.

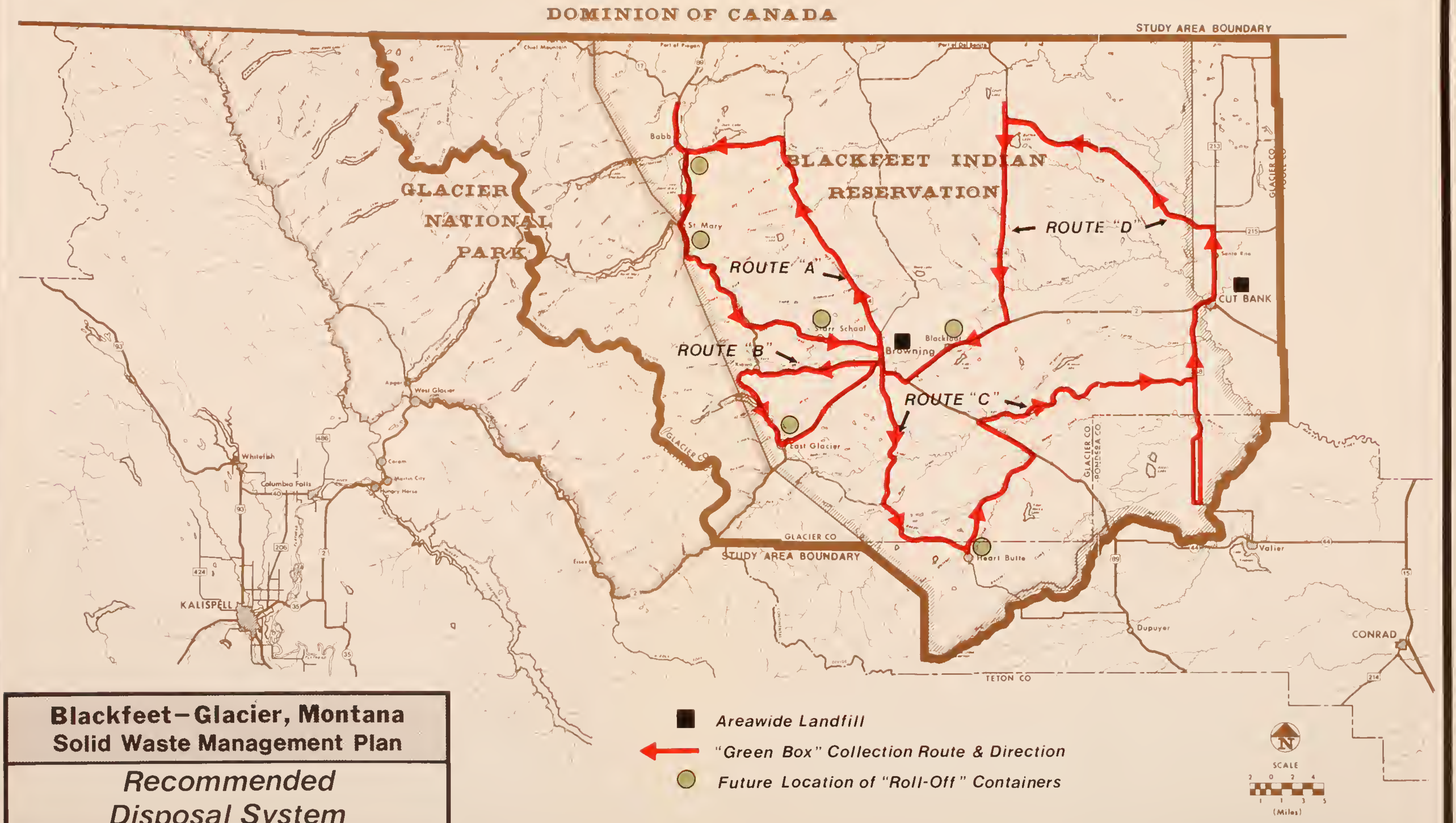
Included in the following paragraphs is a more detailed discussion of the design and operational criteria determined appropriate for the various facilities and equipment included in the recommended disposal plan discussed herein. Since the implementation of the "Roll-Off" system is uncertain at this time, the discussions and costs included in the following text will be limited to the "Green Box" system and the disposal facilities associated with it. The disposal system that has been recommended for the study area is illustrated in Figure 11.

1. "Green Box" Container System

It is assumed that the four-cubic-yard containers and side-loading packer trucks that are currently being utilized under the existing program would continue to be utilized. It is also assumed that additional containers and maintenance of the packer vehicles will be necessary to some extent. As discussed in detail in Part Six, it is also recommended that "mail box" lids be installed on the containers in the extreme western portion of the study area to deter bears in those areas.

As depicted in Figure 11, the collection routes for the recommended plan would be modified to a small degree compared to the existing routes. The major modifications would incorporate the disposal of the wastes collected along Route C at the Cut Bank landfill instead of the Browning landfill, which is currently utilized. This change would allow Route D to be completed in the same trip as Route C.

Under this proposed system, it is anticipated that Routes A and B would be collected an average of five times per week during the tourist season (mid-June to Labor Day) and an average of twice per week during the remainder of the year. It is also anticipated that the remaining two routes would be collected an average of twice per week throughout the year, with no discernible



■ *Areawide Landfill*

"Green Box" Collection Route & Direction

● *Future Location of "Roll-Off" Containers*

Blackfeet–Glacier, Montana
Solid Waste Management Plan

Recommended
Disposal System

Robert Peccia & Associates/ Fred C. Hart Associates

Figure 11

difference between the tourist and non-tourist seasons. Approximately 20,000 miles would be traveled annually by the packer vehicles to service the containers according to this plan. It is estimated that the labor requirements to operate the system would be approximately 2,000 hours per year with substantially more hours required during the summer than the winter, based on one-man crews in the packer vehicles. A more detailed estimate of the "Green Box" system components and requirements are summarized below:

Route	Waste Volumes (Tons/Wk) Winter	Summer	Approx. # of Green Boxes	Avg. # of Trips Per Week Winter	Summer	Approx. Miles per Trip
A	8	38	37	2	5	65
B	37	50	42	2	5	35
C	13	13	32	2	2	107
D	11	12	19	2	2	68

2. Bulky Materials Pickup Service

As previously discussed, the recommended plan includes the use of a special service for the outlying areas to pick up, transport and dispose of large, bulky materials that are periodically generated and require disposal. In order to provide this service to area residents, it is assumed that a dump truck or flatbed vehicle would travel throughout the study area on a prearranged schedule to pick up and transport these materials to either the Browning or Cut Bank landfills for disposal. It is also assumed that additional trips could be made in special situations. Ten trips per year were used as the basis for the cost estimates included herein. It was also assumed that two personnel would be utilized for each trip.

3. Browning Landfill

The recommended plan assumes that the existing landfill site located north of Browning would be utilized. After preliminary investigation, it appears that the site has sufficient capacity to dispose of the study area's wastes for the next 10 to 20 years. It was also assumed that the site would continue to be open six days per week during the summer and three days per week during the remainder of the year. For each day the site is open, a gate attendant would be on duty to supervise dumping and provide general cleanup and maintenance. At the end of each operating day, an equipment operator would utilize a dozer to compact and cover the wastes deposited that day. Trenches would also be periodically excavated at the site by a private contractor.

The basic assumptions discussed above are determined to be the estimated labor and equipment requirements necessary to operate the site in accordance with all state and federal regulations. Although these laws and regulations are not in effect on tribal lands and thus are not enforceable at the Browning landfill site, which is located on federal trust land, it is the Consultant's recommendation that the operating requirements discussed herein should be followed for several reasons. Furthermore, the Blackfeet Tribal Business Council should adopt a tribal regulatory code in the near future that is similar to and compatible with the State of Montana Solid Waste rules and regulations. This code would allow the Tribal Council to require any jurisdictional entity or private enterprise that may manage the site in the future to operate the site in such a manner as to cause no health hazards. In addition, the proper operation of landfills would provide for the protection of public health, reduced fire hazards, protection of surface and groundwater from contamination, and general aesthetics.

4. Cut Bank Landfill

Under the proposed recommended plan, the existing City of Cut Bank landfill would continue to operate under its present conditions. According to state inspection reports, the site is currently operating in general accordance with state and federal regulations and criteria.

C. ORGANIZATIONAL STRATEGY

1. Alternate Strategies

Once the disposal system and corresponding equipment, facility and labor requirements have been determined and finalized, the next implementation step is to identify the most practical organizational strategy. Over the past several years, numerous solid waste organizational concepts have been tried and deemed successful throughout the nation. These concepts include: 1) individual municipal programs; 2) county-wide programs; 3) regional authority-operated programs; 4) non-profit governmental corporation programs; 5) privately operated programs; 6) regulated utility programs; and 7) state-administered programs. Due to the local constraints and conditions within the study area, it is felt that two organizational concepts are potentially applicable in the area for implementation of a solid waste management program. These concepts are summarized herein.

a. Individual Municipal or Area Programs

Currently the State of Montana laws and regulations provide for individual incorporated communities to own, operate or contract the collection, storage, transfer and disposal of solid waste in their communities. Several of the larger communities have used this concept for the past several years with a high degree of success. However, many of the smaller communities that have used this concept have found it to be somewhat inadequate because of the lack of tax base and funds to provide the required degree of service and operation of facilities. With regard to a total study area solution, this organizational concept has a severe drawback in that

limited opportunities are available for the residents living outside the incorporated communities. Under this system, the rural residents must either operate their own disposal site or utilize a municipal site and pay a user fee. Obviously, the duplication of facilities will, in most instances, increase the costs to all residents in the area.

b. Areawide Program

This organizational concept is applicable primarily if a multi-county or multi-jurisdictional solid waste management program is contemplated. Under this concept, a Policy Board would be formed and equitable assessments would be made to each user of the services and facilities provided. The Board would then be responsible for making all administrative, operational, and financial decisions for the waste disposal program.

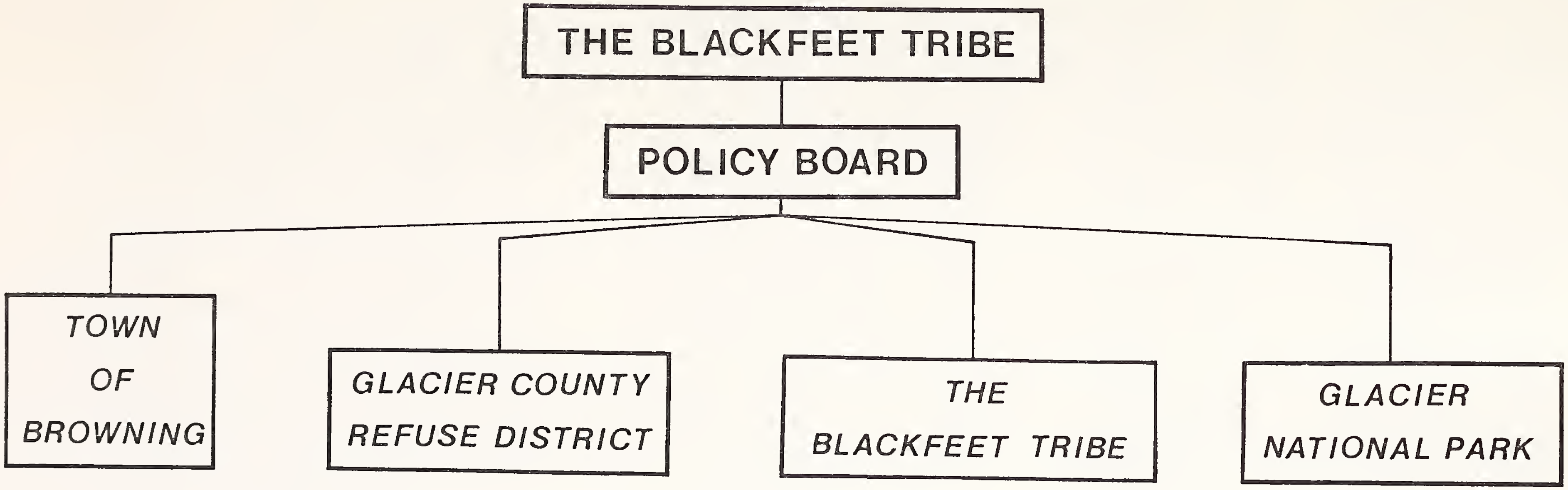
2. Recommended Organizational Strategy

Based on several meetings with the members of the project Technical Committee, the Committee basically recommends that a regional or multi-jurisdictional strategy would be a more beneficial and practical approach to implementing the recommended disposal system than an individual municipal or area program. Therefore, an organizational strategy based on this approach was developed for implementation of the recommended disposal system.

The organizational strategy that was recommended by the Project Technical committee members identifies that The Blackfeet Tribe would be the lead agency for the implementation of the plan. By this recommendation, all necessary contractual agreements, revenues and expenses to own and operate the recommended disposal facilities and services would be the ultimate responsibility of the Tribe. Furthermore, the recommended plan identifies that the Town of Browning, Glacier County and Glacier National Park would have interlocal agreements with The Blackfeet Tribe. These interlocal agreements basically would stipulate that the Tribe would provide the facilities, equipment, and labor deemed necessary to dispose of the entity's wastes and in return the entity would compensate the Tribe on an equitable per ton basis. Letters from the various jurisdictional entities indicating this recommendation are included in Appendix A of this report.

The recommended plan also stipulates that a Policy Board would be formed with each of four major jurisdicitonal entities that have indicated an interest in participating in the program. This Board would be responsible for establishing initial policies, setting appropriate fees, making operational and administrative decisions regarding the operation of the various components of the disposal program, preparing and administering all necessary contracts, and authorizing payments for all expenses incurred by the waste disposal program. Figure 12 summarizes the various entities and strategies of the recommended organization plan. Included herein is a brief summary of the representation and responsibilities of each of the four jurisdictional entities that have indicated their interest in participating in the recommended disposal program.

Organizational Strategy



TOWN OF BROWNING

1) All Non-Indian Residents
2) All Private Businesses, Schools, etc.

GLACIER COUNTY REFUSE DISTRICT

1) Non-Indian Residents.
2) All Private Businesses
3) Schools, Hospitals etc.
4) State and Federal Agencies
5) Pondera County Non-Indians & Businesses Located Within Study Area

THE BLACKFEET TRIBE

All Tribal Associated Residents and Agencies

GLACIER NATIONAL PARK

1) All Federal Facilities Within Park
2) Park Concessionaire

Figure 12

a. Glacier National Park

This entity would include all governmental facilities under the jurisdiction of the National Park Service (NPS). All fees and associated costs of the refuse program attributed to the Park's facilities would be processed and handled through the National Park Service's budgeting and accounting system. Since Glacier National Park is under the jurisdiction of the federal government, however, the representative of the NPS on the Policy Board would act as an advisor rather than a voting member.

b. The Blackfeet Tribe

This entity would include all registered members of the Blackfeet Indian Reservation who live within the study area, as well as all facilities and buildings currently under the jurisdiction of the Reservation. All respective associated costs attributed to this entity for the proposed solid waste program would be processed through the Tribal Business Council's accounting system.

c. Town of Browning

This entity would include all residents of the Town of Browning who are not registered members of The Blackfeet Tribe. Under the proposed plan, all proportionate costs incurred by the solid waste disposal system discussed herein that are attributed to the residents of this entity would be processed through the Town of Browning's budgeting system. The Town of Browning would obtain the necessary funds either through monthly assessments or through annual city taxes. (It should be noted that the current Town of Browning's door-to-door collection service would not be included under this program, and thus this service's accounting and billing procedures would have to be kept separate from the areawide refuse program.)

d. Glacier County

This entity would include all residents not already included in one of the previous entities as well as all private stores, businesses, industries, etc. in Glacier County except those located in the City of Cut Bank. In order to legally establish this entity, the Glacier County Commissioners would be required to form a refuse disposal district. In order to form such a district, the Commissioners must first pass a resolution of intent to create the district, and then mail a notice of intent to each property owner. A 30-day protest period is then assigned, with a public hearing held at the end of this period. If less than a 50 percent protest is obtained, the district can be formed.

Once the county refuse district is formed, each resident or business would be assessed an equitable fee through the county taxes. All fees collected through these assessments would then be processed through the Glacier County accounting and budgeting system.

Basically, the recommended strategy discussed above includes all waste generators within the study area with the exception of three; 1) the non-Indian population residing on the Blackfeet reservation in Pondera County, 2) the corporation that has the concession rights in Glacier National Park, and 3) the non-Indian residents and all public and privately operated facilities and businesses in the City of Cut Bank. Summarized herein is the recommended strategy for these major generators:

a. Pondera County

For the small number of non-Indian residents and businesses located within the study area in Pondera County, it is recommended that these residents and businesses would be assessed through the Glacier County Refuse District. The current state law concerning refuse disposal districts allows for residents and businesses located in separate counties to operate and finance concurrent refuse programs. It is recommended that the Glacier and Pondera County Commissioners work together to determine the simplest and most equitable interlocal agreement to handle the administration and financing of the disposal of the wastes generated within that portion of Pondera County that is located in the study area.

b. Park Concessionaire

Since the Park Concessionaire and National Park Service's waste disposal requirements and services are quite similar, it is the National Park Service's and the Concessionaire's recommendation that all appropriate user fees that are passed to the Concessionaire for the use of the refuse program's disposal facilities should be incorporated into the National Park Service's user assessments. Through an interlocal agreement the Park Service would then in-turn be responsible for collecting the appropriate fees from the Concessionaire. Also the National Park Service would be responsible for reflecting the Concessionaire's interests on the project Policy Board.

c. City of Cut Bank

At this time, no indication has been made by the City of Cut Bank that they wish to be actively involved in this areawide solid waste disposal program. Therefore, it is assumed that the City of Cut Bank would not at this time participate in the program and thus would not be required to contribute any funds. However, it is also assumed that the City would accept a portion of the wastes generated at its landfill, and would be compensated on a per ton basis for these wastes. Also, however, it is recommended that the City of Cut Bank becoming an active member in the solid waste program in the future should be left as an option if all parties concerned determine it to be advantageous.

D. OPERATIONAL STRATEGY

1. Alternate Operational Strategy

One of the initial decisions that must be made by the project Policy Board should be the identification of the most practical and economical operational strategy for each component of the recommended disposal plan. Based on an analysis of the various operational strategies that have been utilized throughout the state, it is apparent that three methods of operation are potentially applicable. Included herein is a brief discussion of each of these methods.

a. Public Operation

This operational strategy includes the ownership and operation of all equipment and facilities by a public entity. Under this strategy it would be this entity's responsibility to purchase all equipment and facilities and hire the necessary employees to operate the system. The primary advantages of utilizing this operational strategy are: 1) potential savings due to certain local and state tax exemptions; and 2) a high degree of control over the supervision and operation of the necessary equipment and facilities. The primary disadvantages of this strategy, in most instances, include: 1) the high capital investment required to initially fund the program; and 2) the inability to obtain maximum effort and efficiency from the equipment due to the periodic use of certain equipment.

b. Private Operation

This operational strategy includes the ownership of all facilities and equipment by a private firm(s). Under this strategy the public entity would contract to a private firm(s) to supply all sites, facilities, and labor required to provide the requested service. In many instances, the most cost-effective contractual arrangement can be made when a five-year contract is made between the private firm(s) and the entity. This allows the firm(s) to purchase and amortize the necessary capital investment over a reasonable period. The primary advantages under this strategy are: 1) it reduces the need to obtain financing of large capital outlays; 2) it maximizes work efficiency and equipment usage; and 3) it provides competitive bidding for the necessary services. The major disadvantage of this strategy is the lower degree of control on the operation of the system. This can usually be overcome if a contract is negotiated containing strict performance clauses.

c. Combination of Public and Private Services

Under this strategy, a public entity would own and/or provide certain facilities and/or services, and a private firm(s) would provide the remainder of the necessary facilities and/or services. In many instances, this strategy has several advantages compared to the other operational strategies. Under this plan, the public entity could provide facilities and services that are already owned or can easily be obtained, and contract the remainder of the services out. This option reduces the capital invest-

ment of the entity to a minimum. In addition, the contracting of certain services can provide for maximum efficiency of equipment and manpower.

2. Recommended Operational Strategy

As stated previously, the ultimate administrative and decision-making duties for the recommended disposal plan will be the responsibility of the Policy Board, which will be represented by each jurisdictional entity. Since the disposal program will require daily monitoring, it is assumed that the Policy Board would hire a full-time manager to supervise the day-to-day operation of the various components of the system as well as to keep the Board informed of the program's status.

Based on several discussions with the members of the Technical Committee, a tentative operational strategy for the proposed waste disposal program has been delineated. Obviously, this strategy must be reviewed, modified as required, and approved by the Policy Board selected to administer the program. This strategy is discussed in the following section, and depicted in Figure 13.

a. Container Systems

1) "Green Box" System

The existing "Green Box" system in use throughout the study area is owned by The Blackfeet Tribe. This system was instituted in 1979 when the containers and initial packer vehicle were obtained through a grant from the Indian Health Service. This system is currently operated and maintained by the High Plains Solid Waste System, a public entity administered through the Tribal Health Department. Based on the current status of the ownership and operation of this system, it is recommended that the High Plains system should continue to operate and maintain the "Green Box" system.

2) "Roll-Off" System

It is recommended that, if a "Roll-Off" system is implemented in the future, either the High Plains Solid Waste System or private enterprise should be utilized to provide the necessary equipment, facilities and labor. The ultimate decision should be made by the Policy Board once the decision to utilize this system has been finalized.

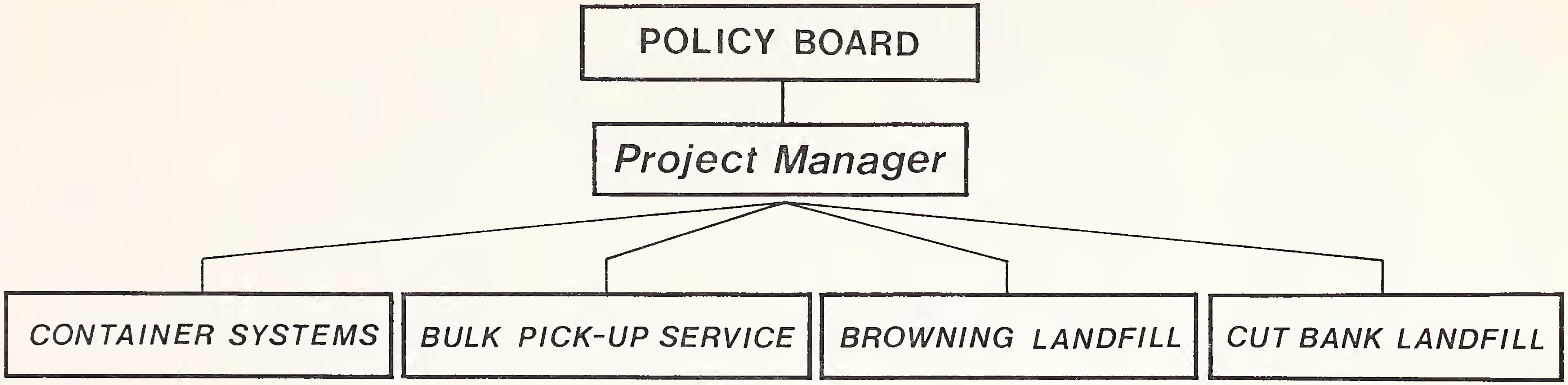
b. Bulky Materials Pickup Service

Since this system is keyed quite closely to the "Green Box" system, it is recommended that this service should be provided by the High Plains Solid Waste System, which would provide all equipment and labor necessary to operate and maintain the system.

c. Browning Landfill

Over the past six years, the existing Browning landfill has been utilized by residents of Browning as well as tribal residents living in the Browning area. The initial development of the landfill site included funds

Operational Strategy



POLICY BOARD

Project Manager

CONTAINER SYSTEMS

1) "Green Box"
    a. High Plains System

2) "Roll-Off"
    a. High Plains System, or
    b. Private Enterprise

BULK PICK-UP SERVICE

High Plains System

BROWNING LANDFILL

Initially
Town of Browning

Ultimately
a. High Plains System, or
b. Private Enterprise

CUT BANK LANDFILL

Subcontract With
City of Cut Bank on
"Drop Charge" Basis

Figure 13

and labor from both the Blackfeet Indian Reservation and the Town of Browning. Currently, the day-to-day landfill operation is the responsibility of the Town of Browning.

After conversations with representatives of the Town of Browning and other project Technical Committee members, it is recommended that the operation of the site be ultimately subcontracted to either High Plains or private enterprise. The new Policy Board may wish to postpone this step for one year to allow the Board ample time to thoroughly evaluate this strategy. In the interim, the Town of Browning should continue to operate the site and be compensated on an equitable per ton basis.

d. City of Cut Bank Landfill

As previously discussed, the current recommended solid waste plan includes the use of the City of Cut Bank landfill to dispose of the wastes generated in the southeastern portion of Glacier County. Under this plan, the City of Cut Bank would continue to be responsible for owning and operating the landfill site, and would be compensated on an equitable per ton basis for disposing of the area's solid waste. However, if the City of Cut Bank elects to join the areawide disposal program in the future, other operational strategies could be developed.

E. FINANCIAL STRATEGY

1. Recommended Strategy

In order to administer and operate the recommended disposal plan discussed in the previous sections of this chapter, it is essential that an implementable and practical financial strategy be developed. The financial strategy that is chosen must: 1) assess and ultimately collect all revenues required to fund the project; and 2) make all necessary payments to the proper jurisdictional entities and/or private enterprise for providing the equipment and labor required to operate the program's facilities and services.

It is recommended that all financial management decisions, including preparation of budgets, assessment of equitable user fees, preparation and approval of subcontracts, and authorization of payments for expenses be the responsibility of the Policy Board. In order to administer the funds for the solid waste disposal program, however, it is necessary to delineate a legal entity through which all funds must pass. There are two options available for this purpose: 1) create a special solid waste authority specifically designed to administer the program; or 2) utilize an existing jurisdictional entity to process all necessary financial transactions.

After various meetings with the members of the Technical Committee, it was the general consensus among the members to utilize an existing jurisdictional entity rather than creating a new solid waste authority. It was also felt that either The Blackfeet Tribe (administered through the Blackfeet Tribal Business Council) or Glacier County (administered through the Glacier County

Commissioners) would be the two most appropriate existing entities to administer the project funds for the recommended areawide solid waste disposal program.

As stipulated in the previous section of this chapter, it is the Technical Committee's recommendation that all assessments and payments would be processed through The Blackfeet Tribe's financing system. Utilizing The Blackfeet Tribe in comparison to Glacier County was recommended by the committee primarily because the Tribe owns and operates the majority of the solid waste system's components currently in use.

2. Budget Requirements

The estimated budget requirements for the recommended disposal plan are included in Table 10. These costs include the depreciation, operation and maintenance costs of the various facilities and equipment identified in Part Six of this report, as well as the various miscellaneous costs deemed necessary to administer and manage the disposal program. As shown in this table, the total annual budget for the recommended disposal program is estimated to be $198,560. Obviously, this cost will increase in future years, depending on inflation. It should be noted that these costs are based on the criteria and unit prices developed in Part Six of this report, and that the exact costs should be determined after the implementation strategy has been finalized.

In order to finance the anticipated expenditures of the recommended disposal program, the Consultant estimated the proportionate cost for each of the jurisdictional entities utilizing the proposed services. The proportionate costs for each jurisdictional entity were derived utilizing the estimated waste quantities developed in Part Three of this report. The estimated proportionate costs for each entity are summarized in Table 11. It should be noted that since Glacier National Park and Park Concessionaire utilize only the Browning landfill and do not utilize the other services included in the waste disposal program, the National Park Service and Park Concessionaire's fees were based on only their proportionate per ton cost on the landfill and associated administrative costs. The remaining jurisdictional entities' assessments, however, were based on the proportionate costs for all services included in the disposal program. The net result of the analysis indicates that the average cost per ton for the National Park Service and Park Concessionaire would be approximately $25.35 per ton whereas the remaining entities' average cost per ton would be approximately $50.66. It should also be noted that the costs depicted herein do not include the National Park Service or Park Concessionaire's cost to transport the wastes from the Park to the Browning landfill.

TABLE 10

RECOMMENDED SYSTEM BUDGET REQUIREMENTS

Item	Annual Expenditures Amortization of Capital	Annual Expenditures Operation, Maint. & Labor	Total
1. Browning Landfill[1]			
a. Site Costs	$11,500	$42,860	$54,360
b. Trench Excavation	0	17,050	17,050
Subtotal:	$11,500	$59,910	$71,410
2. Cut Bank Drop Charge[2]	0	$6,820	$6,820
3. "Green Box" System			
a. Container[3]	$17,170	$ 4,870	$22,040
b. Packer Vehicle[4]	9,020	30,730	39,750
c. Labor[5]	0	20,480	20,480
Subtotal:	$26,190	$56,080	$82,270
4. Bulky Waste Service			
a. Vehicle[6]	$410	$1,950	$2,360
b. Labor[7]	0	3,200	3,200
Subtotal:	$410	$5,150	$5,560
5. Administration			
a. Project Manager	0	$20,000	$20,000
b. Part-Time Secretary	0	6,000	6,000
c. Office Supplies, etc.	0	2,500	2,500
d. Postage & Telephone	0	1,000	1,000
e. Misc. Expenses	0	3,000	3,000
Subtotal:	0	$32,500	$32,500
TOTAL COST:	$38,100	$160,460	$198,560

[1] See Table 7 for cost breakdown

[2] Assumes $10 per ton drop charge

[3] Based on 130 four-cubic-yard containers (50% "bear-proofed")

[4] Based on 33,400 miles per year ($.27/mi. depr. & $.92/mi. O & M)

[5] Based on 2,048 hrs./yr. @ $10/hr.

[6] Based on 2,750 mi./yr. ($.15/mi. depr. & $.71/mi. O & M)

[7] Based on 160 hrs./yr. @ $10/hr.

TABLE 11

PROPORTIONATE COST ESTIMATES

Jurisdictional Entity	Estimated Waste Quantities Tons/Year	Proportionate Annual Cost
Glacier National Park	340[1]	$ 8,620
Town of Browning	80	4,070
Glacier County Refuse District	1,230[2]	62,320
The Blackfeet Tribe	2,440	123,550
Total:	4,090	$198,560

[1] Includes 165 tons for Glacier National Park and 175 tons for Park Concessionaire.

[2] Includes 40 tons generated by the non-indian population of Pondera County that is located within the study area.

Note: All quantities and costs have been rounded off to the nearest significant digit.

F. IMPLEMENTATION SCHEDULE

To effectively and efficiently implement the waste disposal plan identified herein, it is necessary for the local officials and individuals responsible for the program to delineate and follow a detailed schedule. Included in Table 12 is a general implementation schedule that may be appropriate.

TABLE 12

IMPLEMENTATION SCHEDULE

	Task	Estimated Time Frame
1.	Jurisdictional Entities Approve Management Plan	July 1, 1982 - September 1, 1982
2.	Form Glacier County Refuse District	July 1, 1982 - September 1, 1982
3.	Form Policy Board	July 1, 1982 - September 1, 1982
4.	Finalize Operational Strategy	August 1, 1982 - October 1, 1982
5.	Hire Project Manager	August 1, 1982 - Ocotber 1, 1982
6.	Finalize & Award Contracts for Purchase and/or Operation of Necessary Facilities & Equipment	September 1, 1982 - November 1, 1982
7.	Formulate Project Budget	September 1, 1982 - November 1, 1982
8.	Determine Final User Assessments	October 1, 1982 - November 1, 1982
9.	Begin Implementation of New Program	November 1, 1982

APPENDIX A

LETTERS OF RECOMMENDATION

THE BLACKFEET TRIBE

OF THE BLACKFEET INDIAN RESERVATION

BROWNING, MONTANA 59417

EXECUTIVE COMMITTEE

EARL OLD PERSON CHAIRMAN
DANIEL L. GILHAM SR. VICE CHAIRMAN
CHARLES CONNELLY #1 SECRETARY
ELOUISE C. COBELL TREASURER

TRIBAL COUNCIL

EARL OLD PERSON
DANIEL L. GILHAM SR.
CHARLES CONNELLY #1
LELAND GROUND
ARCHIE ST. GODDARD
LEONARD MOUNTAIN CHIEF
GEORGE KICKING WOMAN
JERRY SHOW
PHILIP M. RATTLER JR

MAY 20, 1982

RECEIVED
MAY 24 1982
ROBERT PECCIA
& ASSOCIATES

Glacier County Commissioners
County Courthouse
Cut Bank, Montana

Dear Mr. Commissioners:

In reply to your letter dated May 17, 1982, that Glacier County cannot contract with the Blackfeet Tribe but would be in a position to contract with High Plains Solid Waste System if certain criteria were in place. I would like to explain at this time the full structure of the High Plains Solid Waste System. As early as February 2, 1975 the Blackfeet Tribal Business Council went on record to begin to try and deal with the solid waste problem within the Blackfeet Reservation. This includes Glacier County, City of Browning and all outlying rural areas. Purchase of equipment, manpower and sanitary landfill site were put in immediate process for improved planning. In the early part of 1981, after numerous planning efforts progression was not satisfactory, the Blackfeet Tribal Business Council transferred the direction and supervision to the Blackfeet Tribal Health Board, which is a registered non-profit organization. (Please find enclosed non-profit status papers.) At the beginning of this new directive a complete and totally new accounting system was set up within High Plains Solid Waste System. At the present time all expenses and revenue is put through this bookkeeping system. All dollars are transferred to the Blackfeet Tribal Finance Department, which is audited and money accounted for on a regular basis.

High Plains Solid Waste System feels that in the past five years opportunity has knocked a number of occasions to create a Solid Waste District. If the County should so feel that the initial steps to begin process of creating a Solid Waste District, then you should by all means initiate your resolution to do so and put it before the County voters to find out if this is the alternative that we are looking for.

If and when this Solid Waste District is established under the rules layed down by the State of Montana and the Solid Waste District Board decides they would like to contract with High Plains Solid Waste we would certainly meet or beat all qualifications.

High Plains Solid Waste management would request at this time for your understanding and cooperation in starting this district. As you are aware the City of Browning and the City of Cut Bank landfills are in very bad need of updating to qualify for sanitary landfill operation under Environmental Protection Agency rules and regulations.

If there should be any more delays please feel free to notify me or Mr. Jim Kennedy, Health Board Director. We would be more then glad to come down and talk about the alternatives left open to us.

Thank you

Bill Burd
Solid Waste Manager

Jim Kennedy
Health Board Director

BB/gf

Enclosures

GLACIER COUNTY
CUT BANK, MONTANA

May 17, 1982

Mr. Bill Burd, Manager
High Plains Solid Waste System
P. O. Box 866
Browning, Montana 59417

Dear Mr. Burd:

Please be advised that Glacier County cannot contract with the Blackfeet Tribe, but we could contract with the High Plains Solid Waste System if they are a non-profit bonded corporation.

We would appreciate an answer as soon as possible so we can make plans to create a Refuse District.

BOARD OF GLACIER COUNTY COMMISSIONERS
BY ____________ CHAIRMAN

cc: Robert Peccia & Associates

hief of The Blackfeet Nation

rl Old Person, Chief

). Box 486
wning, Montana 59417
6) 338-7521 or 338-7276

May 5, 1982

Technical Committee Members:

I would like to take this opportunity to convey my sincere appreciation and thank you for your expertise and overall input on the Solid Waste problem that exists within our service area.

The past year of studying the problem that exists in the Solid Waste area has been both informing and productive and I am sure the final plan will be put together as expertly, dedicated and productive as the past year has been in the area of Solid Waste.

I would further like to wish all the best of luck to the future development, planning and structure of putting into operation the continuing phases of the Blackfeet - Glacier Montana Solid Waste Plan.

Again on behalf of the Blackfeet Tribe I must say a job well done.

Thank You,

Earl Old Person, Chairman
Blackfeet Tribe

RECEIVED
APR 1 1982
ROBERT PECCIA
& ASSOCIATES

THE BLACKFEET TRIBE
OF THE BLACKFEET INDIAN RESERVATION
BROWNING, MONTANA 59417

EXECUTIVE COMMITTEE
EARL OLD PERSON CHAIRMAN
DANIEL L GILHAM SR VICE-CHAIRMAN
CHARLES CONNELLY #1 SECRETARY
ELOUISE C COBELL TREASURER

TRIBAL COUNCIL
EARL OLD PERSON
DANIEL L GILHAM SR
CHARLES CONNELLY #1
LELAND GROUND
ARCHIE ST GODDARD
LEONARD MOUNTAIN CHIEF
GEORGE KICKING WOMAN
JERRY SHOW
PHILIP M RATTLER JR

RESOLUTION

NO.__________

WHEREAS: The Blackfeet Tribal Business Council is the duly constituted body of the Blackfeet Tribe within the exterior boundaries of the Blackfeet Reservation organized pursuant to Section 16, of the Act of June 18, 1934, and amendments thereto, and

WHEREAS: The Blackfeet Tribal Business Council's responsibility to the Tribe is to protect, preserve its resource and to develop an economic base for the well-being of its members, and

WHEREAS: The Blackfeet Tribal Business Council is responsible in all areas of endeavor including Health Conditions, Financial Responsibility for Tribal monies, the overall governing entities, and

WHEREAS: The Blackfeet Tribal Business Council has approved a feasibility study of the Solid Waste System on the Blackfeet Reservation, and

WHEREAS: This study being called The Blackfeet-Glacier Montana Solid Waste Management Plan, and

WHEREAS: The Blackfeet Tribe has been working in Solid Waste for the past four (4) years, and is the sole owner of property that the sanitary landfill sits on, and is also sole owner of the High Plains Solid Waste equipment, and

WHEREAS: The Blackfeet Tribe has a centralized bookkeeping system which is financially sound, in its financing practice within their governing body, and

WHEREAS: The Blackfeet Tribal Business Council is fully qualified to enter into cooperative agreements and contracts with other governing bodies, and

NOW THEREFORE BE IT RESOLVED: That The Blackfeet Tribal Business Council be recognized as the Leading Agency for the Blackfeet-Glacier Montana Solid Waste Management Plan.

BE IT FURTHER RESOLVED: That any and all financial agreements or billing systems that is created under this Blackfeet-Glacier Montana Solid Waste Management Plan be handled through the Blackfeet Tribal Business Council Governing System.

THE BLACKFEET TRIBE
OF THE BLACKFEET INDIAN RESERVATION
BROWNING, MONTANA 59417

EXECUTIVE COMMITTEE
EARL OLD PERSON CHAIRMAN
DANIEL L GILHAM SR VICE-CHAIRMAN
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GEORGE KICKING WOMAN
JERRY SHOW
PHILIP M RATTLER JR

MARCH 8, 1982

TO: BLACKFEET TRIBAL BUSINESS COUNCIL

FROM: HIGH PLAINS SOLID WASTE SYSTEM

RE: RECOMMENDATION FOR ORGANIZATIONAL STRATEGY

THE TECHNICAL COMMITTEE DISCUSSED AT GREAT LENGTH VARIOUS OPTIONS AND ALTERNATIVES TO HANDLE THE FINANCIAL PORTION OF THE TOTAL OVERALL MANAGEMENT PLAN. THE TWO AGENCIES THAT WOULD BE MOST OUTSTANDING AND ALSO HAS RELIABLE FINANCE STRUCTURE CAPABLE OF ACCOUNTING FOR DOLLARS THAT IS SUBMITTED BY OTHER GOVERNING BODIES IS: (1) THE BLACKFEET TRIBAL BUSINESS COUNCIL AND (2) THE GLACIER COUNTY COMMISSIONERS.

FUNDS

THE AGENCIES INVOLVED IN THE OVERALL PLAN FOR IMMEDIATE SERVICES AND/OR FINANCIAL INPUT WOULD BE THE FOLLOWING AGENCIES:

(1) BLACKFEET TRIBE: THE BLACKFEET TRIBE IS MORE PREFERABLE TO BE THE LEAD AGENCY FOR THE REASON THAT THE INITIAL CAPITAL TO BEGIN OPERATIONS IS ALREADY IN THEIR OWNERSHIP. THESE INCLUDE SOLID WASTE PICK-UP AND DELIVERY EQUIPMENT, SANITARY REFUGE DUMP AND INVESTED OPERATIONS TO DATE.

(2) GLACIER COUNTY: GLACIER COUNTIES INPUT FINANCIALLY WOULD BE THROUGH A SOLID WASTE DISTRICT. TO DATE THEY HAVE NO CAPITAL INVESTMENT IN EITHER THE PICK-UP AND DELIVERY SERVICES NOR THE SANITARY LANDFILL. THEIR INPUT FINANCIALLY WOULD BE THROUGH COLLECTING TAX ON TAXABLE PROPERTY WITHIN THE STUDY AREA AND/OR OVERALL SOLID WASTE DISTRICT FOR THE ENTIRE GLACIER COUNTY.

(3) TOWN OF BROWNING: THE CITY OF BROWNING IS NOW MANAGING AND OPERATING THE SANITARY LANDFILL NORTH OF BROWNING. THE EQUIPMENT THEY HAVE IS A CAT AND ALSO THE INPUT OF MANPOWER TO OVERSEE SANITARY LANDFILL. THE CITY OF BROWNING HAS THEIR OWN COLLECTION SYSTEM AND THEY WOULD HAVE AN OPTION AT A LATER DATE TO JOIN INDIVIDUALLY AS A CITY OR JOIN THROUGH THE GLACIER COUNTY REFUGE DISTRICT TAX BASIS. THEY HOWEVER WOULD HAVE TO PAY INTO THIS STRUCTURE A GIVEN AMOUNT PER TON TO UTILIZE THE SANITARY LANDFILL.

THE BLACKFEET TRIBE
OF THE BLACKFEET INDIAN RESERVATION
BROWNING, MONTANA 59417

EXECUTIVE COMMITTEE
EARL OLD PERSON CHAIRMAN
DANIEL L. GILHAM SR. VICE CHAIRMAN
CHARLES CONNELLY #1 SECRETARY
ELOUISE C. COBELL TREASURER

TRIBAL COUNCIL
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ARCHIE ST. GODDARD
LEONARD MOUNTAIN CHIEF
GEORGE KICKING WOMAN
JERRY SHOW
PHILIP M. RATTLER JR.

(4) GLACIER NATIONAL PARK: GLACIER NATIONAL PARK WOULD BE IN AN ADVISORY POSITION AS A GOVERNMENT ENTITY. HOWEVER, THE COST THEY SUBMIT TO THE STRUCTURE WOULD BE ASSESSED AT THE AMOUNT OF SERVICES RENDERED TO GLACIER NATIONAL PARK.

BOARD OF DIRECTORS

SHOULD THE BLACKFEET TRIBAL BUSINESS COUNCIL DECIDE THEY WOULD BE THE LEAD AGENCY AND/OR CONTRACTING AGENCY THEY WOULD HAVE THE POWER TO OVERRIDE AND/OR APPROVE ALL DECISIONS MADE BY THIS BOARD OF DIRECTORS AS THEY WOULD BE IN AN ADVISORY CAPACITY. THIS BOARD OF ADVISORS WOULD BE APPROVED BY THE COUNCIL, GLACIER COUNTY COMMISSIONERS, CITY OF BROWNING AND GLACIER NATIONAL PARK BEFORE ANY CONTINUED PLANNING COULD BE ACCOMPLISHED.

MANAGER OF THE PROJECT

THE PROJECT MANAGER WOULD BE DISCUSSED PER HIS DUTIES, RESPONSIBILITIES AND PLANNING STRATEGIES AFTER THE SELECTION OF THE ADVISORY BOARD OF DIRECTORS.

HIGH PLAINS SOLID WASTE AND SANITARY LANDFILL

THESE TWO PROJECTS WOULD CONTINUE TO OPERATE UNDER THE PRESENT STRUCTURE UNTIL THE ABOVE IS PUT INTO OPERATING CONDITION AND IS BROUGHT BEFORE THE TRIBAL COUNCIL FOR DELEGATION OF AUTHORITY AND/OR TO SHOW PROOF OF STABLE AND FINANCIAL STRUCTURE.

HIGH PLAINS SOLID WASTE MANAGEMENT FURTHER RECOMMENDS THAT THE HIGH PLAINS STAY UNDER THE AUTHORITY OF THE HEALTH BOARD FOR AN ADDITIONAL NINETY DAYS AFTER THE BOARD OF DIRECTORS FOR THE SOLID WASTE PLAN IS ESTABLISHED.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Health Services Administration

Billings Area
Indian Health Service
2727 Central Avenue
P.O. Box 2143
Billings MT 59103

Our Reference: EHE-SFC

Mr. Barry Damschen
Robert Peccia & Associates
810 Hialeah Court
Helena, Montana 59601

Dear Mr. Damschen:

I have reviewed the Blackfeet-Glacier Montana Solid Waste Management Plan, with particular interest in the conclusions and the recommended solid waste management plan.

After consideration of the alternatives for the lead agency, I feel the Blackfeet Tribe should be designated the lead agency. The Tribe currently owns the equipment which would be utilized and would be responsible for approximately 60% of the cost of the program. Despite the designation of the Tribe being the lead agency, a Board of Directors should be appointed with all the responsibilities and authority to control the solid waste program's financial and managerial respects.

Cordially,

Gary McFarland

Gary McFarland, P. E.
District Engineer
Kalispell District Office

cc: Service Unit Director, PHS Indian Hospital, Browning, Montana

United States
Environmental Protection
Agency

Region 8, Montana Office
Federal Building
301 S. Park, Drawer 10096
Helena, Montana 59601

EPA

ROBERT PECCIA
& ASSOCIATES

Ref: 8MO

[illegible] 1982

Barry E. Damschen
Robert Peccia and Associates
810 Hialeah Court
Helena, Montana 59601

Dear Barry:

You requested that the technical committee members for the Blackfeet-Glacier solid waste management project nominate a lead agency for implementation of the plan.

As a member of that committee, I would like to suggest that the Blackfeet Tribe assume the responsibility for plan implementation as the lead agency. The Tribe, through the High Plains Solid Waste System, is currently acting in that capacity.

I will see you at the next meeting in April if it falls on a date other than the following: 1 through 9, 15, 22 and 23.

Sincerely yours,

Jim

James C. Harris
Environmental Engineer

DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
SOLID WASTE MANAGEMENT BUREAU

TED SCHWINDEN, GOVERNOR
Room A201, COGSWELL BUILDING
STATE OF MONTANA
Telephone: (406) 449-2821
HELENA, MONTANA 59620

March 15, 1982

Barry Damschen
Robert Peccia & Associates
810 Hialeah Court
Helena, Montana 59601

Re: Blackfeet Glacier solid waste plan

Dear Barry,

As per the March 2, 1982 technical committee discussion the Solid Waste Management Bureau recommends that the Blackfeet tribe be the lead agency for implementing and operating the recommended plan. All other entities would contract for their proportionable cost share with the Tribe.

This is only a recommendation and is not intended in any way to be construed as being mandatory. It is our opinion based on our knowledge of past and present political and practical factors.

Sincerely,

Vic R. Andersen

Vic R. Andersen
Solid Waste Management Bureau
Environmental Sciences Division

VRA:cw

AN EQUAL OPPORTUNITY EMPLOYER

United States Department of the Interior
NATIONAL PARK SERVICE
GLACIER NATIONAL PARK
WEST GLACIER, MONTANA 59936

IN REPLY REFER TO:

D5019

May 7, 1982

Mr. Barry E. Damschen
Robert Peccia & Associates
810 Hialeah Court
Helena, Montana 59601

Dear Mr. Damschen:

The draft report for the Blackfeet-Glacier, Montana Solid Waste Management Plan has been reviewed by the National Park Service and we concur with the content and recommendations. It is the Park's recommendation that the report be approved with the minor changes discussed at the last meeting of the Technical Committee, and that implementation begin as soon as possible.

The implementation strategy with the Blackfeet Tribal Council acting as lead agency appears to be the most expeditious and efficient means to make the program work and we support the concept. The National Park Service will develop a memorandum of understanding to provide the administrative means for participation in the program.

I want to express appreciation to the Blackfeet Tribe for initiating the Regional Solid Waste Study and to all of the agencies and personnel that served on the Technical Committee. We are looking forward to implementation of the program and continuing participation to make the program successful.

Sincerely,

Robert C. Haraden
Superintendent

cc:
Earl Old Person, Chairman

Waterton-Glacier International Peace Park 50th Year 1932-82

THE TOWN OF BROWNING

Browning, Montana 59417

Phone 338-2344

May 15, 1982

Barry E. Damschen, P.E.
Robert Peccia & Associates
Planners-Engineers-Designers
810 Hialeah Court
Helena, Montana 59601

Dear Mr. Damschen,

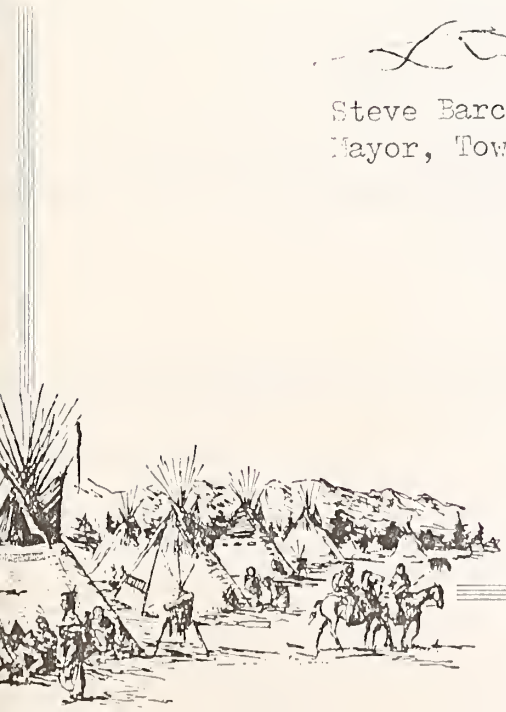
I have reviewed your report for the formation of a Solid Waste District on the Blackfeet Reservation, I agree with the plan.

I believe the Blackfeet Tribal Council should be the lead agency.

The Town of Browning will participate in the Solid Waste District.

Sincerely,

Steve Barcus
Mayor, Town of Browning



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7. AUTHOR(S) Barry Damschen, Daniel Norderud, Stephen Orzynski		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Robert Peccia & Associates 810 Hialeah Court, Box 4518 Helena, Montana 59604	Fred C. Hart Associates 1320 Seventeenth Street Denver, Colorado 80202	10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO. 68 - 01 - 6008
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16. ABSTRACT

Due to jurisdictional-related problems, low populations and vast distances between population centers, and extremely seasonal waste generation characteristics, the disposal of solid waste in the Blackfeet Indian Reservation – Glacier National Park area has presented various problems for the past several years. This report presents an analysis of the current problems confronting local officials in the area, and alternate solutions to the problems that exist.

The solid waste management plan summarized in the report recommends that the existing non-licensed disposal sites in the area should be closed. In addition, the existing "Green Box" container system should be expanded to all areas encompassed by the study, and all wastes should ultimately be disposed of at either of two licensed landfills in the area. The plan also recommends that a Policy Board consisting of representatives from the Blackfeet Tribe, Glacier County, the Town of Browning, and the National Park Service should be formed to implement the plan and make all necessary decisions concerning the management, financing and operation of the proposed waste disposal system. Ultimately, it is recommended that all financial arrangements should be conducted through the Blackfeet Tribal Business Council, primarily because most of the existing waste disposal facilities and equipment are currently owned and operated by the Tribe.

17. KEY WORDS AND DOCUMENT ANALYSIS

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Sanitary Landfill, Solid Waste Disposal, Solid Waste Transfer Systems, Solid Waste Management Plan	Glacier County, Montana Blackfeet Indian Reservation Glacier National Park	

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